GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 - Maintain Laboratory or Field Workplace Safety

Week 1

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Agenda

1. Introduction

- Learning and Assessment Plan (LAP) & assessments
- Learning resources

2. Laboratory induction

- emergency exits & safety alarms
- emergency response system
- Signs and symbols
- designated WHS personnel

Introduction - LAP

Learning and Assessment Plan (LAP) on BlackBoard

Assessments

- 1 x theory assessment
- 1 x project, including a portfolio of evidence based on your practical activities completed in other classes.

You must be assessed satisfactory for all assessment activities to be CO for the unit.

Resources included:

Take 5 booklets

Why do we need to learn about safety?

- Watch video https://www.youtube.com/watch?app=desktop&v=6aK2CKrdjbE
- List all the things Mr Bean got wrong and post it to Padlet

Why do we need to learn about safety?

- **Because laboratory work is high risk!**
  - Hazardous and dangerous chemicals
  - Biological hazards
  - Hot and cold thermal hazards
  - Electrical, radiation, magnetic fields and pressure hazards
  - Ergonomic set up of work stations
  - Manual handling and repetitive tasks
  - Glassware, ceramics and other sharps
  - Noisy equipment

Emergency plans for the workplace

- Raising the alarm
- Emergency exits
- Emergency stops and other shutdown systems
- Firefighting equipment
- Eye wash and safety showers
- Spill kits
- Safety data sheets and SOPs
- Storage of PPE, first aid
- Handwashing
- Biosafety

General safety symbols

Geometric shape	Meaning	Safety colour	Contrast colour to the safety colour	Graphical symbol colour	Examples of use
Circle with diagonal bar	Prohibition	Red	White[a]	Black	— No smoking — Not drinking water — Do not touch
Circle	Mandatory action	Blue	White[a]	White[a]	— Wear eye protection — Wear protective clothing — Wash your hands
Equilateral triangle with radiused outer corners	Warning	Yellow	Black	Black	— Warning; Hot surface — Warning; Biological hazard — Warning; Electricity
Square	Safe condition	Green	White[a]	White[a]	— First aid — Emergency exit — Evacuation assembly point
Square	Fire equipment	Red	White[a]	White[a]	— Fire alarm call point — Collection of fire fighting equipment — Fire extinguisher

[a] The colour white includes the colour for phosphorescent material under daylight conditions with properties as defined in ISO 3864-4.

This Photo by Unknown Author is licensed under CC BY-SA

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Symbols and signs

stock.adobe #353418655

stock.adobe #407224574

stock.adobe #279332910

stock.adobe #354391737

Symbols and signs

Machine and equipment labelling

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Designated WHS people

- Laboratory Supervisor (Lecturer)
- WHS advisor (NMT lab techs)
- Health and Safety Representative (HSR)

- Roles are assigned with additional training
  - The Fire Warden directs evacuation of building in an emergency, e.g. fire
  - The First Aider responds to injury and illness

Internal sources of WHS information

- Other sources of health and safety information at NMATFE
- NMTAFE library
- https://www.northmetrotafe.wa.edu.au/safety-health-and-security

NMTAFE East Perth Emergency & Security: 0417 903 299
In a life-threatening emergency dial (0) 000
Review NMTAFE's emergency plan

Activity 1: Laboratory induction

- Review the **Laboratory Guidelines**
- Emergency diagram for the laboratory, identify all:-
  - Emergency exits
  - Emergency stops and other shutdown systems
  - Firefighting equipment
  - Eye wash and safety showers
  - Spill kits
  - Safety data sheets and SOPs
  - Storage of PPE,
  - First aid

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Conclusion – Takeaways

What did we learn?

- Working in a laboratory is high risk
- Requirement for emergency planning and support equipment
- Signs and symbols
- Designated people

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 - Maintain Laboratory or Field Workplace Safety

Session 2

Last week…

- Laboratory Safety Induction:
  - Lab walkthrough
  - Emergency exits & safety alarms
  - Emergency response systems (including SOPs, SDSs, equipment e.g. safety shower, spills kits etc.)
  - Signs and symbols
  - Designated WHS personnel (NM TAFE)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Agenda

Laboratory Safety

- Possible characteristics and composition of the workforce
  - How will this affect/impact WHS management?
- PPE
  - use, care and storage requirements

Terminology

- PCBU:
  - Person Conducting Business and Undertaking.
  - i.e. Employer (person or organisation)/self-employed
  - What is a person conducting a business or undertaking.pdf (safeworkaustralia.gov.au)
- Composition of workforce:
  - % or number of persons in each role within an organisation.
  - Deals with organisational structure
- Characteristics of workforce:
  - Differences / features between groups of workers in the workforce

Key safety personnel in an organisation

- WHS Advisor
- Safety Officer
- Fire Wardens
- First Aider
- Senior management positions, e.g., Site Senior Executive for mines

- Health and Safety Representative (HSR)

Code of practice - Work health and safety consultation, cooperation and coordination

Duty holder responsibilities

Under the WHS Act 2020,

Section 19

- **PCBUs** have a **primary duty of care** to eliminate risks in the workplace, or if that is not reasonably practicable, minimise the risks so far as is reasonably practicable.

Section 28

- **Duties of workers:** must take reasonable care for:-
  - their own health and safety, and
  - the health and safety of others

More later in the session on Legislation.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Responsibilities of supervisors

- Frontline supervisors are the direct link between management and the workforce.
- They are responsible for following the directions of management, implementing the site's safety and health management systems, and supporting the organisation's safety culture.
  - The actions and behaviours of supervisors will influence the safety and health of workers, as well as the working environment.
  - Having insufficient or inexperienced supervisors can lead to situations that increases safety and health risks to workers.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Responsibilities of contractors

- A contractor is a worker who carries out work with an organisation, which does not directly employ them.
  - E.g. labour hire arrangement, subcontractors, etc.
- Contractors have specific duties of care under the WHS Act when:
  - supplying goods, material and substances
  - using dangerous goods and hazardous chemicals
  - installing plant and equipment.
- Contractors also have a duty as workers under the WHS Act.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Health and safety committees

- Dedicated and formal time to have regular and structured discussions about health and safety matters.
- An HSC can be a particularly effective way to consult:
  - if you need to consult with workers on the same matters across different work groups or workplaces
  - where there are several PCBUs with responsibilities for the same health and safety matters
  - if workers are reluctant to take on the role of an HSR, but some would be willing to participate on a committee.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Health and safety committees

The functions of an HSC include:

- cooperation between the PCBU and workers in identifying, developing and implementing health and safety measures
- assisting to develop health and safety standards, rules and procedures that will be followed at the workplace, and
- any other functions as agreed by the PCBU and the HSC and documented in a constitution.

Health and safety committees

- The agreed functions of the HSC will consider the size and complexity of the workplace.
- Membership of an HSC is agreed between the PCBU and the workers but
  - At least half of the members of the HSC must be workers who have not been nominated by the PCBU.
  - Any HSRs are automatically members of an HSC, unless they do not wish to participate.

This Photo by Unknown Author is licensed under CC BY

Characteristics of the workforce

- Must also consider the characteristics of the workforce when
  - supervising
  - providing instruction and training
  - consulting

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

What are some characteristics?

- Different backgrounds
  - ESL, religion, cultural, ethnicity, disability, gender, educational level
- Different employment arrangements
  - Full-time, part-time, casual
  - Workplace based, remote
  - Day shift, 24hr shift coverage, weekends, rotating shift
- Work abilities and skills,
  - Experience, professional, operational, trainee

Characteristics of the workforce

How does this affect management of WHS?

- Training programs that are student centred
- Varied methods of consultation and issue resolution
  - Face to face, online platforms
  - Days and timing to suit rosters
  - Union representation, support person
- Clear succinct language used in documents
  - WHS policies, procedures, safety bulletins, incident reports, inspection checklists, risk assessments
- Use of images, standard colour coding, symbols used for signs and labels in obvious places around the workplace
- Workplace culture
  - Leadership, "*walk the talk*"
  - Development and support programs

PPE – Personal Protective Equipment

- The PCBU must give workers PPE if they need it unless it has been provided by another PCBU.
- It is also the duty of the PCBU to train workers – and visitors to the workplace – to understand how to **use, clean and store it** properly.
- A worker does not pay for their PPE. The PCBU must check and fix any problems a worker is having with their PPE.

https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/personal-protective-equipment-ppe/overview

Your task

1. You are assigned one of the PPE categories listed:
   - Eye and face protection
   - Hand protection
   - Hearing protection
   - Respiratory protection
2. Select a specific item of PPE from the category you are assigned (e.g. hand protection: acid-resistant gloves).
3. Research the use, care, and storage for the PPE item you have picked.
4. Look for any International Standards (ISO) or Australian Standards (AS/NZS) governing PPE.
5. Present your information in a safety bulletin to be shared in Week 3 with the rest of your team
   - Template: Blackboard > Learning Materials > WHS Management System > Templates > 06 TM Safety Bulletin Template V1.docx

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Conclusion – Takeaways

What did we learn?

- Roles and responsibilities under WHS legislation of employers and employees, including supervisors and contractors
- Key safety personnel in a workplace
- How the characteristics and composition of the workforce can impact on WHS management
- Occupational protective equipment / PPE
- Preview of legislation

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Laboratory Safety

Common hazards in the lab

Session 3

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Getting your fingers burnt by science!

- A particular bright spark came to me to complain that his stirrer hotplate wasn’t heating so I asked him to show me.
- His response was to place his hand directly on the – now hot – hotplate burning himself in the progress.
- When I asked him 'why he did that?', he said that it didn’t get hot straight away so he thought it was broken and this was the best way to demonstrate the problem.
- We had to explain that touching hot things with your bare hands is not the best idea – with his hand in ice, he nodded in agreement…

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

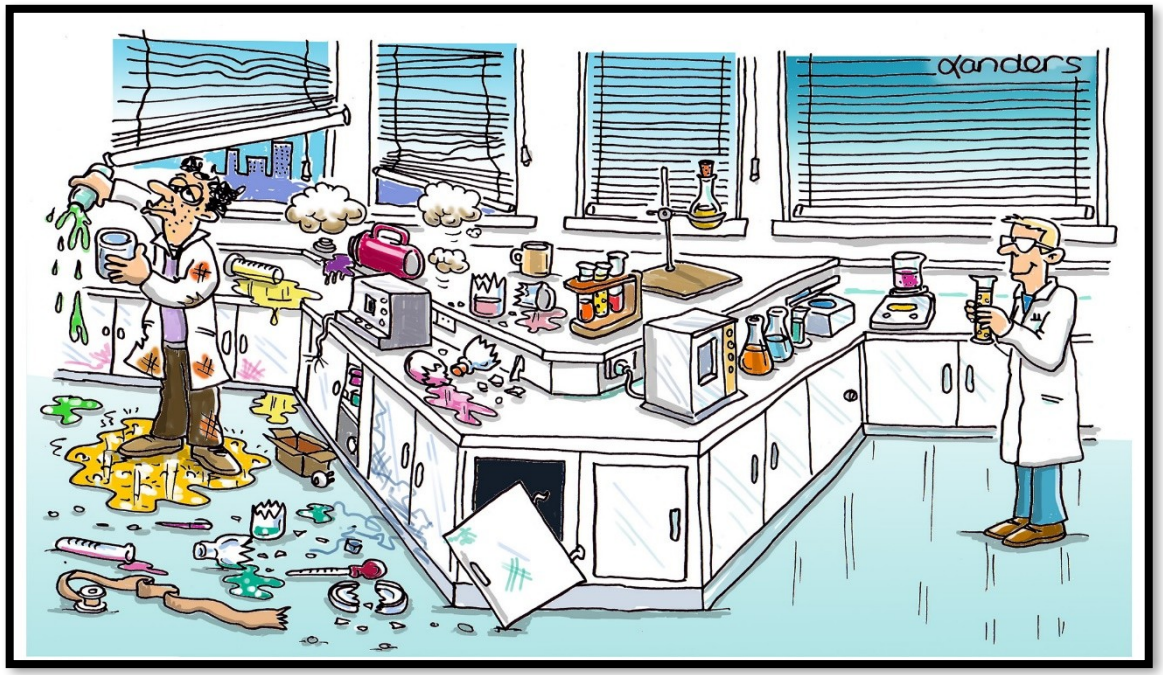
Agenda

1. Review evacuation map and questions to be completed and uploaded to BlackBoard by Week 4.
2. WHS terminology
    1. Hazards, risks, risk management, hierarchy of control, ALARP
3. Identify and Assess Hazards
4. Risk Assessment & ALARP
5. Control Measures
6. Take 5 & JSAs
7. Takeaways shared with the class

Session 1&2 review

- Completion of NMTAFE evacuation diagram
- Orientation theory questions on BlackBoard to be completed and uploaded by WEEK 4.

What is a Hazard?



This Photo by Unknown Author is licensed under CC BY-SA-NC

- A hazard is a source or a situation with the potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these.

[What is a hazard and what is risk? (dmp.wa.gov.au)]

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Common laboratory hazards

Hazard category	Exposure to
Chemical	Respiratory sensitisers, carcinogenic, toxic, or corrosive chemicals, hot/cold or explosive or flammable reactions
Biological	Bacteria, viruses, flora and fauna
Physical *(definition in next slide)*	working with or near hot/cold equipment or surfaces, noise (continuous or very load bursts), sustained, repetitive or awkward postures, lifting or carrying objects, crowded or blocked walkways, pressurised vessels, handling sharp objects
Mechanical	Moving or flying objects / people / vehicles
Gravitational	uneven/ slippery surfaces, falling objects, working at a height
Radiation	Ionising (alpha, beta, x-rays), non-ionising (UV, visible light, microwaves)
Electrical	Live power (high and low voltage), extension cords, faulty tools
Psychosocial	Lighting, continuous noise, persistent unfair workload, deadlines, hot or cold work environment, workplace bullying

What is a physical hazard?

- Physical hazards are actions, or conditions in the work environment that cause physical harm or injury. You do not necessarily have to be in contact with them.

- Examples of physical hazards at work include manual handling, noise, vibration, radiation, electricity, confined spaces, working at heights and extreme temperatures.

- Physical hazards | Comcare

What is Risk ?

- A risk is th… …
  happeni… …e effect.
  The lev…
  – the …
  – the … …anted
  event…

A risk is the chance of a hazard hurting you or somebody else or causing some damage

What is a hazard…

Image sourced from
5 Safety Hazards In The Laboratory (storemasta.com.au)

What is Acceptable Risk ?

- Acceptable risk – risk that has been reduced to a level that can be tolerated by a workplace having regard to its legal obligations and its own WHS policy.

What is Risk Factor?

- Conditions that may contribute to the risk:
  - The working environment such as work area design and layout
  - The training and skill level of persons undertaking work
  - The systems of work being used and work organisation
  - Loads, selection and condition of tools and equipment

What are controls?

- Controls are the measures put in place to decrease the likelihood or consequences from an unwanted event.

Control factor	
Likelihood	prevent the unwanted event or reduce the loss of control of the hazard (e.g. reduce or contain energy release).
Consequence	reduce the effects (e.g. provide shield from hazard; event has happened, but emergency response and medical treatment reduce the severity and duration of consequences).

- What is a hazard and what is risk? (dmp.wa.gov.au)

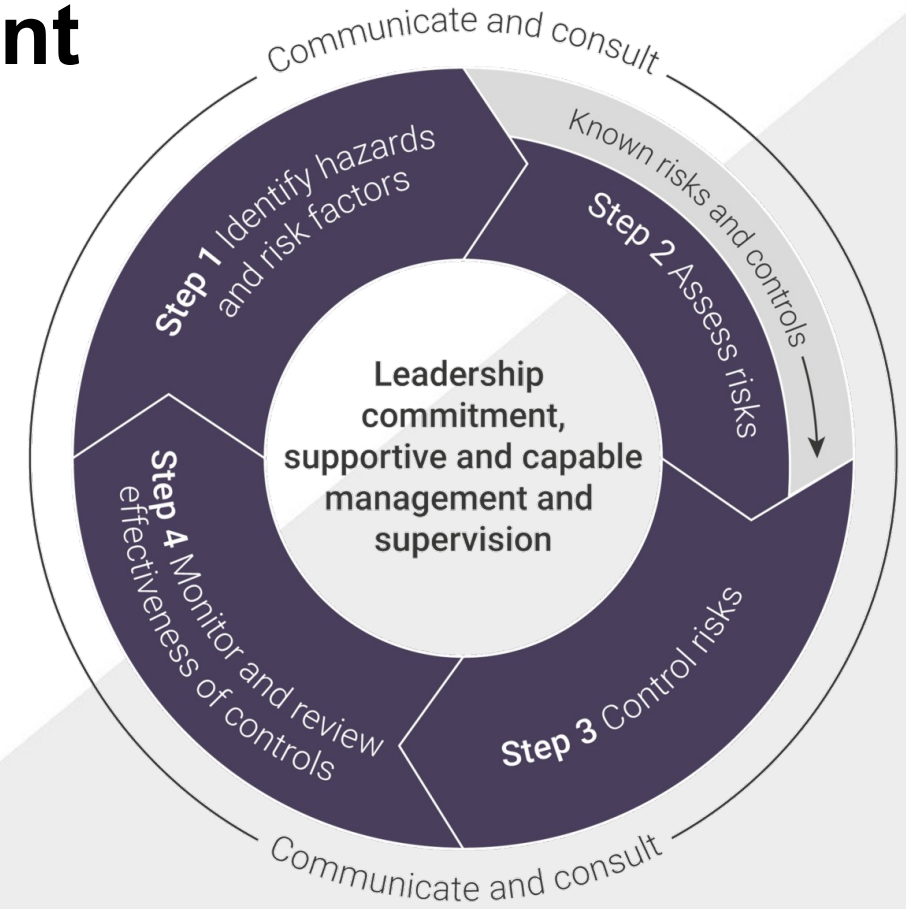
Risk Management

- A proactive, logical and systematic process for managing safety and health risks in the workplace
- Continuous improvement system
  - Keeps workers safe by reducing the number and the severity of events
  - Ensures compliance to legislation
  - Identifies opportunities
  - Mitigates losses

[Why is risk management important? (dmp.wa.gov.au)]

Main elements of risk assessment

- Identify hazards
- Assess the risks
- Control the risks by implementing controls (ALARP principle)
- Monitor and review the effectiveness of controls
- Communicate and consult


Communicate and consult
Known risks and controls
Step 1 Identify hazards and risk factors
Step 2 Assess risks
Step 3 Control risks
Step 4 Monitor and review effectiveness of controls
Leadership commitment, supportive and capable management and supervision
Communicate and consult

[Risk management overview (dmp.wa.gov.au)]

AS/NZS ISO 31000 Risk management - Principles and guidelines

Identify and assess hazards

Identifying hazards involves looking for situations that could potentially cause harm or injury to people or damage to equipment or pollution of the environment.

Hazards are affected by risk factor conditions

Inspect the workplace, **consult** with work colleagues, **review** available documents such as SDS, equipment operating manuals and SOPs

How to identify hazards - Assessing and controlling risk, part 1 – YouTube (1:50)

How to identify hazards - Assessing and controlling risk, part 2 – YouTube

Risk Assessment

- Once the hazards have been identified, the risk need to be assessed. This include determining:
  - Who will be affected and how?
  - How severe is the harm likely to be? (extreme, high, moderate, and low).
  - How likely is it to happen? (very likely, likely, moderate, unlikely and rare).
  - We use a risk matrix tool

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Risk Assessment

RISK ASSESSMENT INPUTS					
Step 1-Estimate Probability		Step 2-Estimate Consequences			
	Probability		Health	Financial	Operational	Environmental
A	Almost certain (Often occurs / Once a week)	1	Negligible No injuries	Negligible Minimal financial loss	Negligible 1 hour or less of lost production	Negligible No environmental impact
B	Likely (Could easily happen / Once a month)	2	Minor First aid treatment	Minor Medium financial loss	Minor 6 hour of lost production	Minor Minor environmental impact
C	Possible (Could happen or known it to happen / Once a year)	3	Moderate Medical treatment	Moderate High financial loss	Moderate 12 hour of lost production	Moderate Moderate environmental impact
D	Unlikely (Hasn't happened yet but could / Once every 10 years)	4	Major Hospitalisation	Major Large financial loss	Major 3 to 7 days of lost production	Major Major environmental impact
E	Rare (Conceivable, but almost impossible / Once every 100 years)	5	Catastrophic Death	Catastrophic Massive financial loss	Catastrophic Greater than 1 week of lost production	Catastrophic Severe environmental impact

Risk Assessment

RISK ASSESSMENT MATRIX						
Step 3-Calculate the Risk		Consequence (C)				
		1	2	3	4	5
Probability		Negligible	Minor	Moderate	Major	Catastrophic
A	Almost certain	11 HIGH	16 HIGH	20 EXTREME	23 EXTREME	25 EXTREME
B	Likely	7 MODERATE	12 HIGH	17 HIGH	21 EXTREME	24 EXTREME
C	Possible	4 LOW	8 MODERATE	13 HIGH	18 HIGH	22 EXTREME
D	Unlikely	2 LOW	5 LOW	9 MODERATE	14 HIGH	19 HIGH
E	Rare	1 LOW	3 LOW	6 MODERATE	10 HIGH	15 HIGH

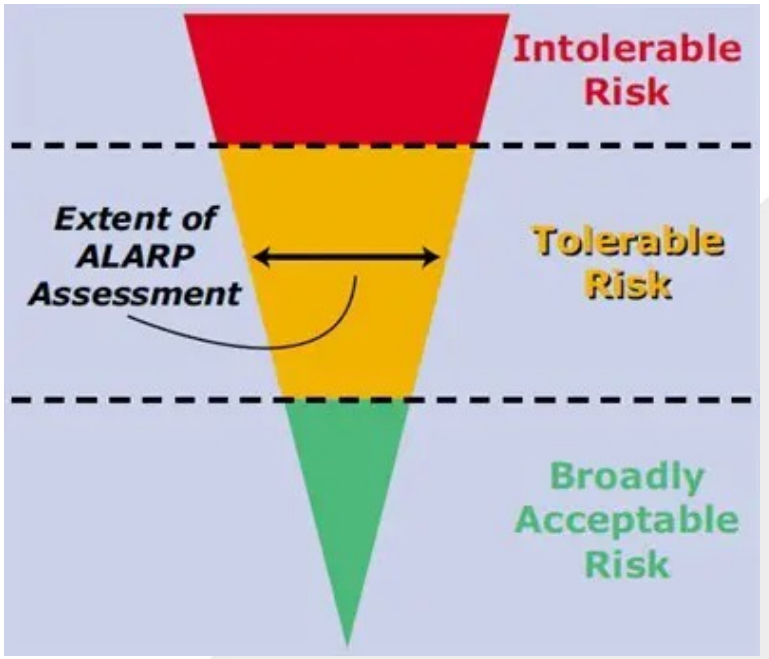
GOVERNMENT OF WESTERN AUSTRALIA

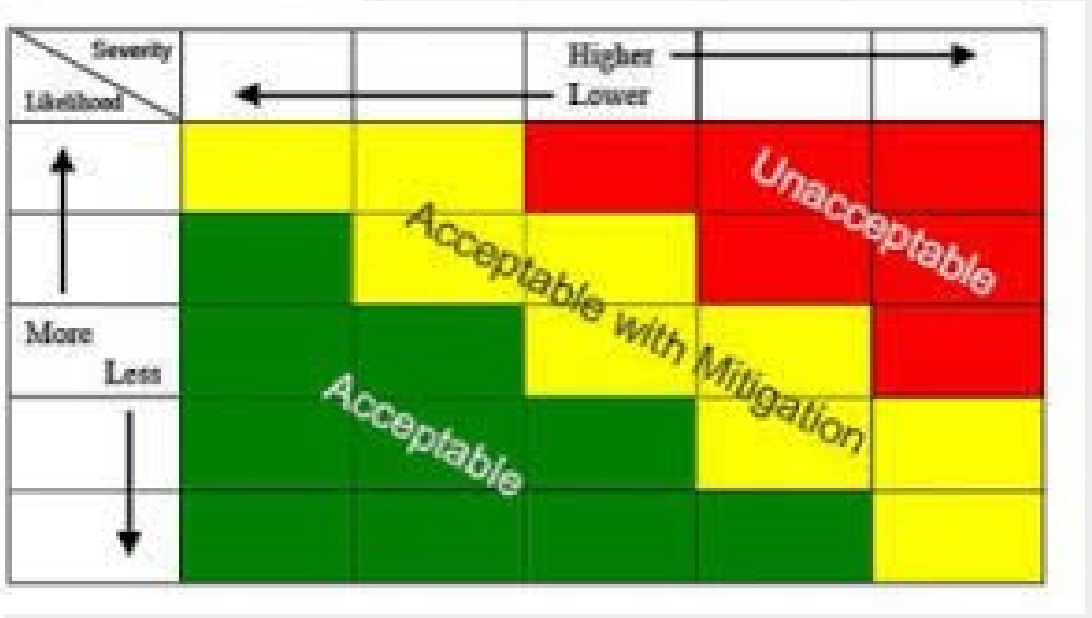
TAFE WA North Metropolitan

ALARP Principle

- As
- Low
- As
- Reasonably
- Practicable

- Reasonably practicable involves comparing risk against the effort in time labour and money needed to control it.
- ALARP describes the level to which we expect to see workplace risks controlled.





GOVERNMENT OF WESTERN AUSTRALIA

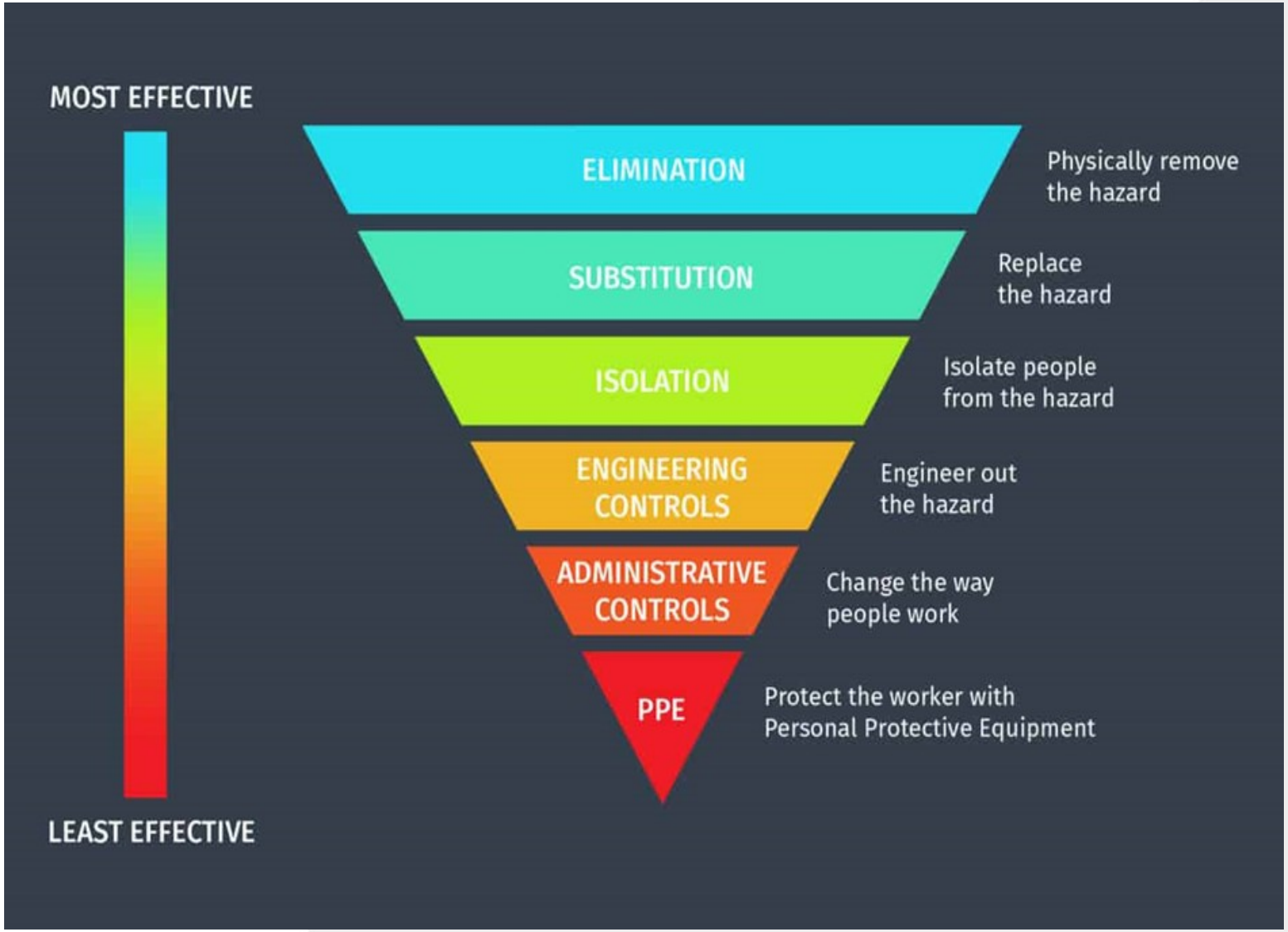
TAFE WA North Metropolitan

Hazard Control Measures

THE HIERARCHY OF CONTROLS | Ally Safety Toolbox Talk (youtube.com)
(3:59)

How to implement controls - Assessing and controlling risk, part 3 (youtube.com)
(2:06)

How to check controls - Assessing and controlling risk, part 4 – YouTube
(1:33)



GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

What is a Take 5?

- A Take 5 is a personal risk assessment tool
- It is completed prior to starting a task
- It is used to inspect a work area and ensure all known hazards are controlled and to check for any new hazards that may not have been identified in the SOP/SWI.

Date: _____ Name: _____

Task:

1: Stop – Think through the task	Y	N
Do I understand what I need to do?		
Do I know where the emergency equipment are?		
Do I have the correct PPE in good condition?		
Do I have the suitable tools and equipment?		
Is the work area safe, have I read the SDS/s?		
Am I trained, competent and fit to do this task?		
2: Identify the hazard/s (specify on next page)	Y	N
1. **Manual Handling** (e.g. lifting, awkward positions)		
2. **Gravity** (e.g. slips, trips and falls, falling objects)		
3. **Mechanical** (e.g. moving parts, flying objects)		
4. **Electrical** (e.g. faulty tools, close to live power)		
5. **Chemical** (e.g. Inhalation, Ingestion, Absorption)		
6. **Pressure** (e.g. contact with pressurised fluid/gas)		
7. **Noise** (e.g. hearing damage, masking of alarms)		
8. **Biological** (e.g. bacteria/viruses, flora/fauna, etc)		
9. **Radiation** (e.g. exposure to x-rays, sunlight or UV)		
10. **Psychosocial** (e.g. stress, fatigue, depression)		
11. **Heat & Cold** (e.g. hot/cold objects, environment)		
3: Identify the Controls (next page)	Y	N
Are hazards controlled using Hierarchy of Control?		
4: Perform Personal Risk Assessment (next page)	Y	N
Is any residual risk level ≥ Moderate (7)?		
5: Perform task safely	Y	N

If you have ticked any grey boxes, please STOP!
See your supervisor; further action required.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

The Take 5 process

1. STEP 1: Stop – think through the task
- Check off each item
- Answer each question honestly
- **Stop** if you answer "NO" and see your supervisor

2. STEP 2: Identify EVERY hazard.
- Tick the "Y" box if it is present, or
- Tick the "N" box if it is not.

Date: _____ Name: _____

Task:

1: Stop – Think through the task	Y	N
Do I understand what I need to do?		
Do I know where the emergency equipment are?		
Do I have the correct PPE in good condition?		
Do I have the suitable tools and equipment?		
Is the work area safe, have I read the SDS/s?		
Am I trained, competent and fit to do this task?		
2: Identify the hazards (specify on next page)	Y	N
1. **Manual Handling** (e.g. lifting, awkward positions)		
2. **Gravity** (e.g. slips, trips and falls, falling objects)		
3. **Mechanical** (e.g. moving parts, flying objects)		
4. **Electrical** (e.g. faulty tools, close to live power)		
5. **Chemical** (e.g. Inhalation, Ingestion, Absorption)		
6. **Pressure** (e.g. contact with pressurised fluid/gas)		
7. **Noise** (e.g. hearing damage, masking of alarms)		
8. **Biological** (e.g. bacteria/viruses, flora/fauna, etc)		
9. **Radiation** (e.g. exposure to x-rays, sunlight or UV)		
10. **Psychosocial** (e.g. stress, fatigue, depression)		
11. **Heat & Cold** (e.g. hot/cold objects, environment)		
3: Identify the Controls (next page)	Y	N
Are hazards controlled using Hierarchy of Control?		
4: Perform Personal Risk Assessment (next page)	Y	N
Is any residual risk level ≥ Moderate (7)?		
5: Perform task safely	Y	N

If you have ticked any grey boxes, please STOP!
See your supervisor; further action required.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

The Take 5 process

STEP 3: turn over the page,

- In the table, record the hazard ID number for each section
- Identify a suitable control for each hazard using the hierarchy of control
- Use the risk matrix to assess the residual risk

STEP 4: turn back and continue

- Answer “Is any risk equal to or higher than moderate 7”?
- **Stop** if you answer “YES” and see your supervisor

STEP 5: perform the task safely

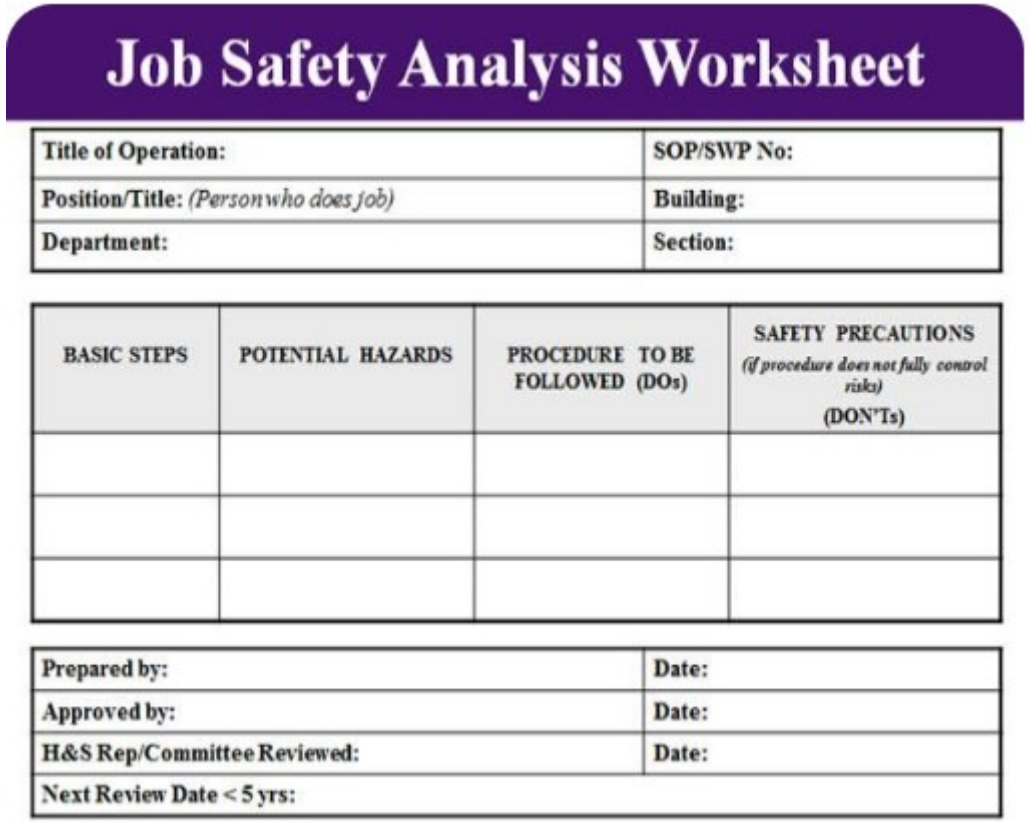
2-4. Personal Risk Assessment – I see it I manage it

Sections	**Hazard/s number/s** (from previous page)	**Controls**	**Res. Risk**
Samples & Reagents			
Equipment			
Work area			
Supervisor initial & date:			

What is a Job Safety Analysis? (JSA/JHA/JSEA)

- A JSA is another risk assessment **tool**
- It is useful for training and sets the job standard.
- A JSA looks at a work task and identifies all potential hazards or risks for each **step** of the task
- It then identifies controls to eliminate the hazards or minimise the risk of harm by following the hierarchy of control categories.
- A JSA is conducted for each task done for the first time, a change to the process or equipment has occurred, or the TAKE 5 task risk is too high

JSA template



Job Safety Analysis Worksheet

Title of Operation:	**SOP/SWP No:**
Position/Title: *(Person who does job)*	**Building:**
Department:	**Section:**

BASIC STEPS	POTENTIAL HAZARDS	PROCEDURE TO BE FOLLOWED (DOs)	SAFETY PRECAUTIONS *(if procedure does not fully control risks)* (DON'Ts)

Prepared by:	**Date:**
Approved by:	**Date:**
H&S Rep/Committee Reviewed:	**Date:**
Next Review Date < 5 yrs:	

- JSAs are **group-based** risk assessments
- The Supervisor must review and sign off before anyone signs on
- Team members working on the task must sign on before starting the job
- JSAs must be kept on-the-job and filed once completed

Other risk assessments

- Laboratory risk assessments – looks at all hazards and identifies the minimum controls for each hazard type. Used for
  - building new facilities
  - introducing new equipment, processes, or projects
- Chemical risk assessments – identify controls for hazardous substances covering handling and storage. Used for
  - reviewing existing hazardous chemicals register
  - Assessing the requirements for new chemicals coming to site

Conclusion – Takeaways

- What is a hazard?
- Can you name some common types of laboratory hazards?
- What is a risk?
- What is a risk matrix and how is it used to evaluate a hazard?
- What is the hierarchy of control?
- How is the hierarchy of control applied to control a hazard?
- What are 2 examples of risk assessments?

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 - Maintain Laboratory or Field Workplace Safety

Session 4

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

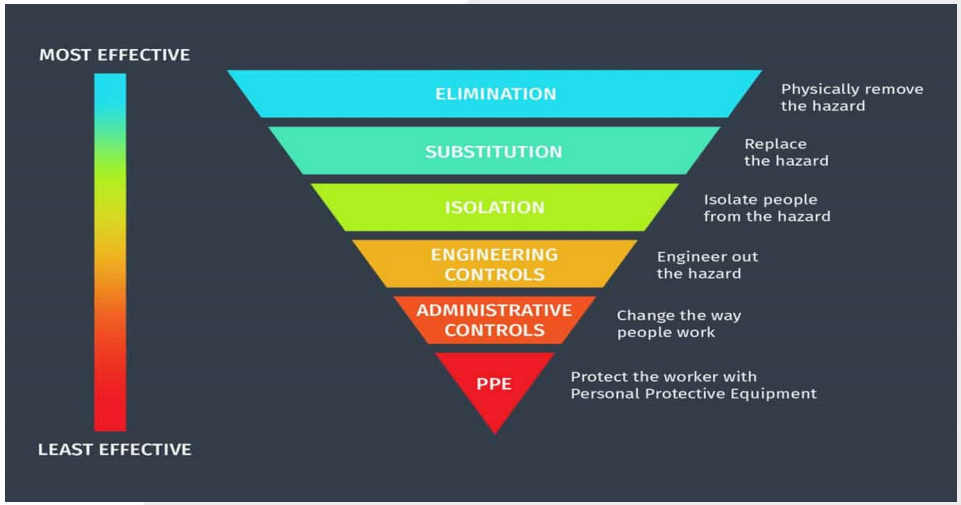
Introduction

- https://www.youtube.com/watch?v=BRDApYgvDqQ
- Your tasks are to ensure others in the workgroup work safely and follow procedures for hazard identification and risk control and implement safe work practices.

- Perform all work safely
- Ensure others in the work group are able to implement safe work practices
- Monitor observance of safe work practices in the work area

Recall

- Definition of hazards, risks, controls and risk management
- Common hazards, hierarchy of control, and ALARP
- Take 5
- Exemplar



Agenda

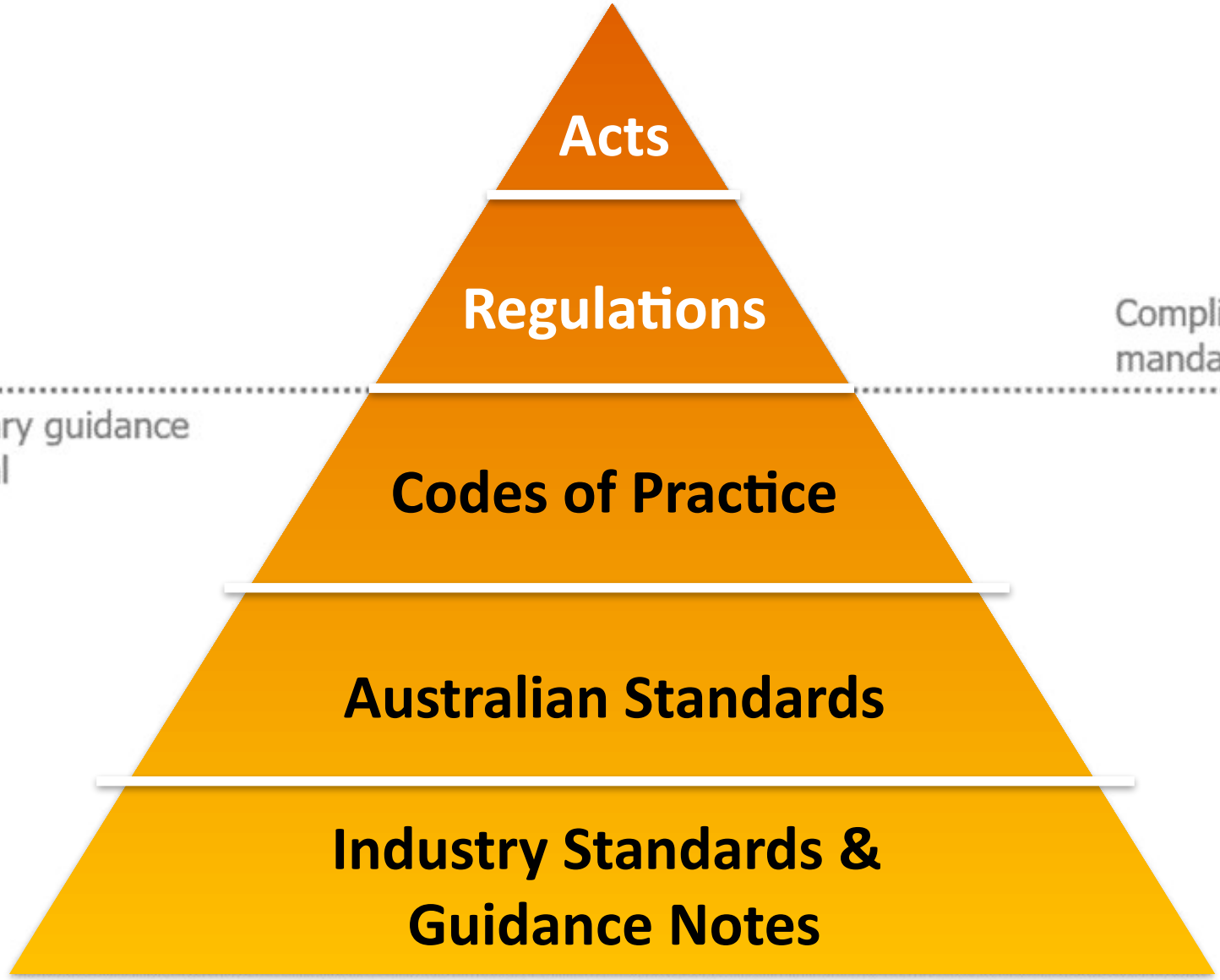
Laboratory Safety

- Work Health and Safety (WHS) Act and regulations, regulatory authorities (state)
- Duty holders
- Codes of practice, guidelines
- Identifying hazards
  - conducting housekeeping inspections
- Reporting hazards, incidents/ accidents and near misses
  - Reporting matrix
  - templates
- Peer Safety Observations

Work Health and Safety (WHS)

1. The focus of every workplace is to ensure all **tasks** are performed in a **safe** and efficient manner by creating and maintaining a **safe work environment**.
2. Framework to support a safe work environment is covered under Workplace Health and Safety (WHS) legislation.

North Metropolitan TAFE



GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Work Health and Safety (WHS)

Key outcomes of WHS legislation:

- Identifies workplace conditions required to ensure the safety and wellbeing of all employees.
- Describes requirements to achieve safe work environments:
  - use **safe work methods**, and
  - **maintain equipment and machinery** to appropriate specifications.
- Describe the **responsibilities** of both employers and employees to identify and rectify workplace situations with the potential for causing incidents, injuries and / illness.

WHS legislation

The WHS legislation includes:

- Western Australia Work Health and Safety Act (2020)
- Western Australia Work Health and Safety (General) Regulations 2022

- https://www.commerce.wa.gov.au/worksafe/work-health-and-safety-laws-1

Note:

The WHS Act is supported by three sets of regulations:

1. Work Health and Safety (General) Regulations
2. Work Health and Safety (Mines) Regulations
3. Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Other relevant legislation

- Radiation Safety Act 1975
- Radiation Safety (General) Regulations 1983; Radiation Safety (Qualifications) Regulations 1980; Radiation Safety (Transport of Radioactive Substances) Regulations 2002
- Gene Technology Act 2000 and the Gene Technology Regulations 2001
- Environmental Protection Act
- Dangerous Goods Act 2004

Duty holder responsibilities

Under the WHS Act 2020,

Section 19

- **PCBUs** have a **primary duty of care** to eliminate risks in the workplace, or if that is not reasonably practicable, minimise the risks so far as is reasonably practicable.

Section 28

- **Duties of workers:** must take reasonable care for:-
  - their own health and safety, and
  - the health and safety of others

PPE

- The PCBU must give workers PPE if they need it unless it has been provided by another PCBU.
- It is also the duty of the PCBU to train workers – and visitors to the workplace – to understand how to **use, clean and store it** properly.
- A worker does not pay for their PPE. The PCBU must check and fix any problems a worker is having with their PPE.

https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/personal-protective-equipment-ppe/overview

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Responsibilities of contractors

- A contractor is a worker who carries out work with us and we don't directly employ them.
- Contractors have specific duties of care under the WHS Act when:
  - supplying goods, material and substances
  - using dangerous goods and hazardous chemicals
  - installing plant and equipment.
- Contractors also have a duty as workers under the WHS Act.

Regulatory body

Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) – WorkSafe:

- Under the Act, the **WorkSafe Commissioner** is the **regulator** responsible for administering all laws relating to health and safety.
- Ensures consistency with health and safety standards across Western Australia.

- WorkSafe | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)

Published material supporting legislation

Approved codes of practice

- Practical guides to achieving the required WHS standards described in the WHS legislation
  - Managing risks of hazardous chemicals in the workplace – code of practice
  - How to manage work health and safety risks – code of practice (commerce.wa.gov.au)
  - Code of practice - Labelling of workplace hazardous chemicals | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)
  - First aid in the workplace,

Approved codes of practice | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)

Published material supporting legislation

Approved guidance notes

- provide practical guidance for employers and workers on the management of WHS risks that may arise in relation to specific hazards.
- Exposure Standards for Atmospheric Contaminants - Safe Work Australia
- Preparing for emergency evacuations - Commission for Occupational Safety and Health

Approved guidance notes | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)

Published material supporting legislation

Australian and international standards –

- Provide guidance on how to ensure safety performance and detail minimum specifications for goods, services and systems
  - AS 1200:2015 Pressure equipment,
  - AS 2030.1:2009 Gas cylinders – General requirements

Australian Standards | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Regulatory requirements for laboratories

- AS/NZS 2982 Laboratory design and construction
- AS/NZS 2243 Parts 1-10 inclusive – Safety in Laboratories
- AS 1940 – The Storage and Handling of Flammable and Combustible Liquids
- AS 60079 – The Storage and Handling of Gases in Cylinders
- AS/NZS 2430 – Classification of Hazardous Areas

Safety data sheets (SDS)

- SDSs are documents that communicate information on chemicals.
- The information contained in SDSs can be broken into four components:
  - **Identification** - the name (and alternative names) and properties of the chemical
  - **Hazards** - any physical (i.e.: fire and reactivity), health, and environmental hazards
  - **Prevention** - safe handling, storage, and disposal requirements
  - **Response** - appropriate response for various situations (e.g.: first-aid, fire, etc.)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Safety data sheets (SDS)

SDSs must be:

- readily available to employees who are required to use hazardous substances
- not more than 5 years old, from issue date,
- used in training; and
- used for information about the substances for risk assessments

understanding_sds_fact_sheet.pdf (safeworkaustralia.gov.au)

Safety data sheets (SDS)

- Must be available to all workers using the chemical
- A register of SDSs must be kept for all hazardous chemicals stored and handled in a workplace.
- SDSs may be located where chemicals are used and/or stored
- Where is NMTAFE Laboratory SDS located?

SDS exemplar

Supelco®

www.sigmaaldrich.com

SAFETY DATA SHEET

Version 8.9
Revision Date 08.03.2024
Print Date 10.03.2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium hydroxide pellets for analysis EMSURE®

Product Number : 1.06498
Catalogue No. : 106498
Brand : Millipore
CAS-No. : 1310-73-2

1.2 Other means of identification

No data available

1.3 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis, Chemical production

1.4 Details of the supplier of the safety data sheet

Company : Merck Life Science Pty Ltd
Ground Floor, Building 1, 885 Mountain Highway
BAYSWATER VIC 3153
AUSTRALIA

Telephone : +61 1800 800 097
E-mail address : customersupport.anz@merckgroup.com

1.5 Emergency telephone

Emergency Phone # : Free call (24/7): 1800 862 115
Int'l (24/7): +61 2 9037 2994
(CHEMTREC)

SECTION 2: Hazards identification

2.1 GHS Classification

Corrosive to Metals (Category 1), H290
Skin corrosion/irritation (Sub-category 1A), H314
Serious eye damage/eye irritation (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Millipore- 1.06498 Page 1 of 11

The life science business of Merck operates as MilliporeSigma in the US and Canada

MERCK

- Sodium Hydroxide (pellets)
- Issue date and supplier details
- Sections 1-16
- Hazard pictograms

Safety data sheets (SDS)

- What do I do if the SDS for the hazardous chemical I have at my workplace is out of date?
  - Remove it from publication if the chemical is no longer used
  - Request an updated version form the supplier or manufacturer
- What are the steps if the manufacturer is no longer around?

External Sources

- WorkSafe
  - Guidance about hazardous chemicals | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)
- SafeWork Australia
  - - Safety data sheets | Safe Work Australia
  - National Guide
- Hygienists
  - AIOH – Australian Institute of Occupational Hygienists

External Sources

- Hazardous Chemical Information System (HCIS)
- Australian Pesticides and Veterinary Medicines Authority
- National Transport Commission Australia
- Therapeutic Goods Administration

Safety data sheets (SDS)

- Globally harmonised system (GHS) designed by UN to be adopted worldwide to:
  - Uniformly classify chemicals
  - Communicate chemical hazards through labels and safety data sheets (SDS).

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

GHS system for labelling hazardous substances

[Labelling of workplace hazardous chemicals – code of practice (commerce.wa.gov.au)]

GHS01—Exploding bomb
Explosion, fire, blast or projection hazard.

GHS02—Flame
Flammable liquids, vapour, solids and gases; including self-heating and self-igniting substances.

GHS03—Flame over circle
Oxidising liquids, solids and gases, may cause or intensify fire.

GHS04—Gas cylinder
Gases under pressure.

GHS05—Corrosion
Corrosive chemicals, may cause severe skin and eye damage and may be corrosive to metals

GHS06—Skull and crossbones
Fatal or toxic if swallowed, inhaled or in contact with skin.

GHS07—Exclamation mark
Low level toxicity. This includes respiratory, skin, and eye irritation, skin sensitisers and chemicals harmful if swallowed, inhaled or in contact with skin

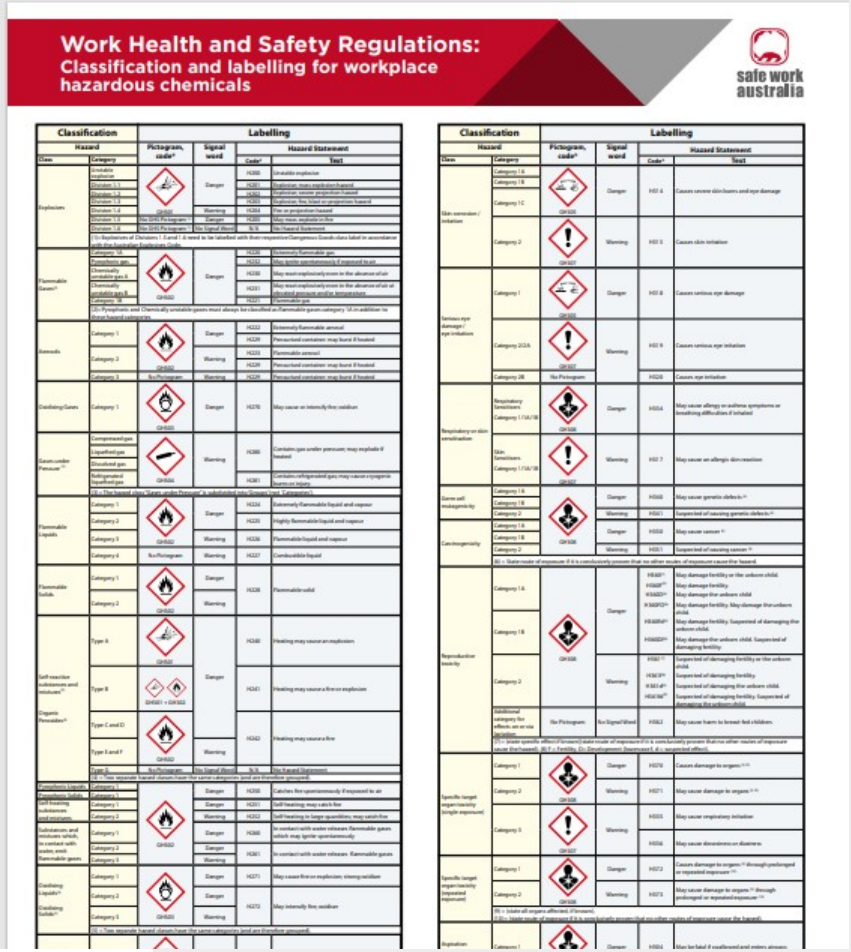
GHS08—Health *Hazard*
Chronic health hazards; this includes aspiratory and respiratory hazards, carcinogenicity, mutagenicity and reproductive toxicity.

GHS09—Environment
Hazardous to aquatic life and the environment.

Safety data sheets (SDS)

[Using the GHS | Safe Work Australia]

classification_and_labelling_for_workplace_hazardous_chemicals_210412.pdf (safeworkaustralia.gov.au)



Safety data sheets (SDS)

- Activity
- Research the following chemicals, online
  - Concentrated sulfuric acid
  - Kovacs reagent
  - Silver Nitrate (solid)
  - Potassium Permanganate

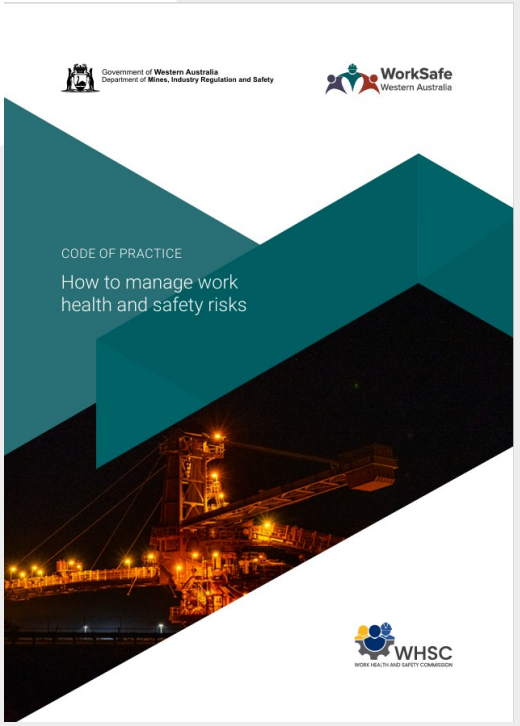
WHS legislation breaches

Both the **Act** and the **Regulations** are **enforceable,** and **breaches** may result in one or more of the following actions:

- Employment termination
- Directions to cease operations (by DEMIRS Inspector)
- Undertake remedial actions (to fix the problem)
- Prosecution
- Fines (individual, organisation)
- Jail time for industrial manslaughter (individual)

Identification of Hazards

- Hazards generally arise from the following aspects of work and their interaction (not always obvious):
  - physical work environment
  - equipment, materials and substances used
  - work tasks and how they are performed
  - work design and management



Code of practice - How to manage work health and safety risks | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)

Identification of Hazards

- Inspections of the workplace, e.g. hazard hunt, housekeeping
- Consultation with stakeholders
  - workers doing the tasks
  - Supply chain, manufacturers of equipment, hazardous substances
  - Industry bodies / guidance materials
- Review current information
  - SDS, manufacturer operating manuals
  - risk registers, incidents, near misses and hazard reports, health monitoring

Image sourced from https://www.dropsonline.org/resources-and-guidance/

Housekeeping inspections

- Poor housekeeping is a common cause of injuries. Checklists cover:
  - Access and layout of ground/flooring/ workstation
  - Ventilation, lighting, labelling
  - Storage of equipment and materials
  - Waste disposal

[Code of practice - Managing the work environment and facilities | Department of Energy, Mines, Industry Regulation and Safety (commerce.wa.gov.au)](#)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Checklist template

- Housekeeping checklists are to be completed
  - In **consultation** with your supervisor as you must be observed,
  - May be completed just prior to a laboratory practical **or** on the completion of a laboratory practical.
- Any identified hazards must be recorded on a Hazard report and submitted to BlackBoard with your checklist.

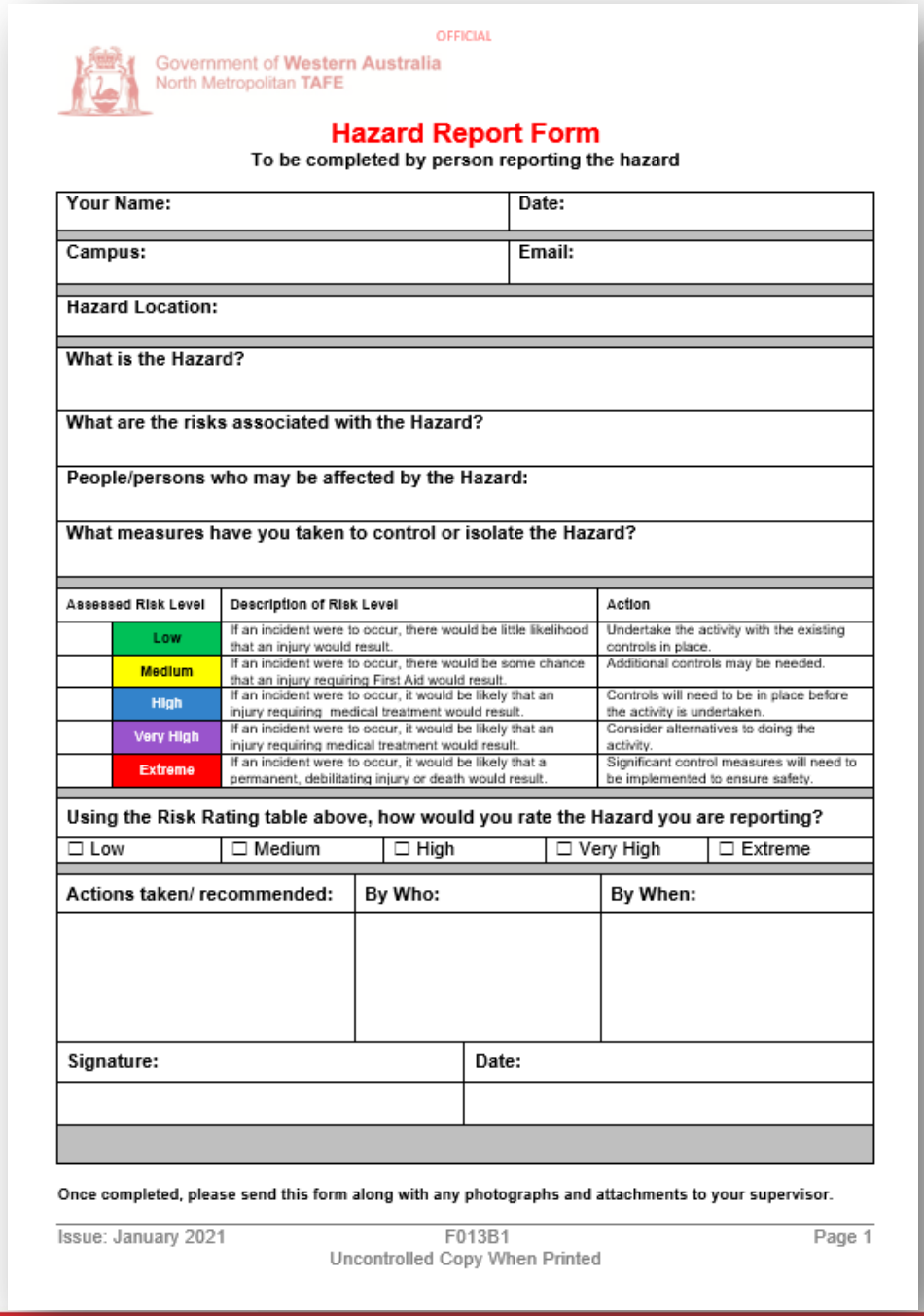
WSE—Housekeeping Checklist

✔/X	Note	Criterion
		Operations
		No food/drink in lab
		Biohazard box disposed if >3/4 full
		Chemical waste disposed if 80% full or >60 days old
		Benches wet-cleaned and dried
		Floors
		Debris, powder & liquid immediately cleaned up
		Floor/walking space clear of trip hazards & obstructions
		No floor storage of hazardous materials or fragile items/glass
		Benches & tables
		Spilled material immediately cleaned up
		Free of abandoned experiments, pipettes, gloves, tools, chemicals, etc.
		All hazardous materials labeled
		Sharps shielded or disposed
		Sufficient room to conduct new experiments, unless experiment running
		Hazardous materials returned to storage
		Chemical fume hoods/Biological safety cabinets
		Kept closed when not in-use
		Airfoil clear (e.g., not foil-covered)
		Spilled material immediately cleaned up
		Clean/dirty materials separated (BSC only)
		No chemical waste storage (CFH only)
		No abandoned/dirty equipment
		No storage of equipment or materials
		Refrigerators/freezers
		Regularly defrosted (where necessary)
		All materials labeled
		Seal clean and intact
		Glass-joint/septa not used as seals
		Written inventory, with owners
		Storage
		No materials piled too high (esp. within 18" of sprinkler head level)
		Hazardous materials in secondary containment
		No corrosives stored above eye level (of shortest researcher)
		Cabinet tops have no storage on top
		Long-term storage in stockroom/storage room/warehouse, not lab
		Lasers/optical tables
		No shiny things loose on optical tables
		When not in-use, laser control key removed and properly stored
		Unused optics properly covered

Use this checklist daily before you leave the lab!

Reporting hazards

- Hazards are recorded on a template and submitted to the supervisor



OFFICIAL

Government of Western Australia
North Metropolitan TAFE

Hazard Report Form

To be completed by person reporting the hazard

Your Name:	**Date:**
Campus:	**Email:**
Hazard Location:	
What is the Hazard?	
What are the risks associated with the Hazard?	
People/persons who may be affected by the Hazard:	
What measures have you taken to control or isolate the Hazard?	

Assessed Risk Level		Description of Risk Level	Action
	Low	If an incident were to occur, there would be little likelihood that an injury would result.	Undertake the activity with the existing controls in place.
	Medium	If an incident were to occur, there would be some chance that an injury requiring First Aid would result.	Additional controls may be needed.
	High	If an incident were to occur, it would be likely that an injury requiring medical treatment would result.	Controls will need to be in place before the activity is undertaken.
	Very High	If an incident were to occur, it would be likely that an injury requiring medical treatment would result.	Consider alternatives to doing the activity.
	Extreme	If an incident were to occur, it would be likely that a permanent, debilitating injury or death would result.	Significant control measures will need to be implemented to ensure safety.

Using the Risk Rating table above, how would you rate the Hazard you are reporting?

☐ Low ☐ Medium ☐ High ☐ Very High ☐ Extreme

Actions taken/ recommended:	By Who:	By When:

Signature:	Date:

Once completed, please send this form along with any photographs and attachments to your supervisor.

Issue: January 2021 F013B1 Page 1
Uncontrolled Copy When Printed

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Peer to peer safety observations

- Recall last week characteristics and composition of the workforce affect the management of WHS
- Peer to peer observations can assist in improving work performance and promoting a positive safety culture in the workplace.
- It targets reinforcing positive safety behaviours.
- Bing Videos (6:34)

Peer to peer safety observations (PPSO)

PROs

- Ownership for safety lies with everyone
- Transfer of learning and skills
- Talking about safe work practices
- Improved workplace culture
- Cost effective
- Lead to continuous improvement
- Real time feedback

Cons

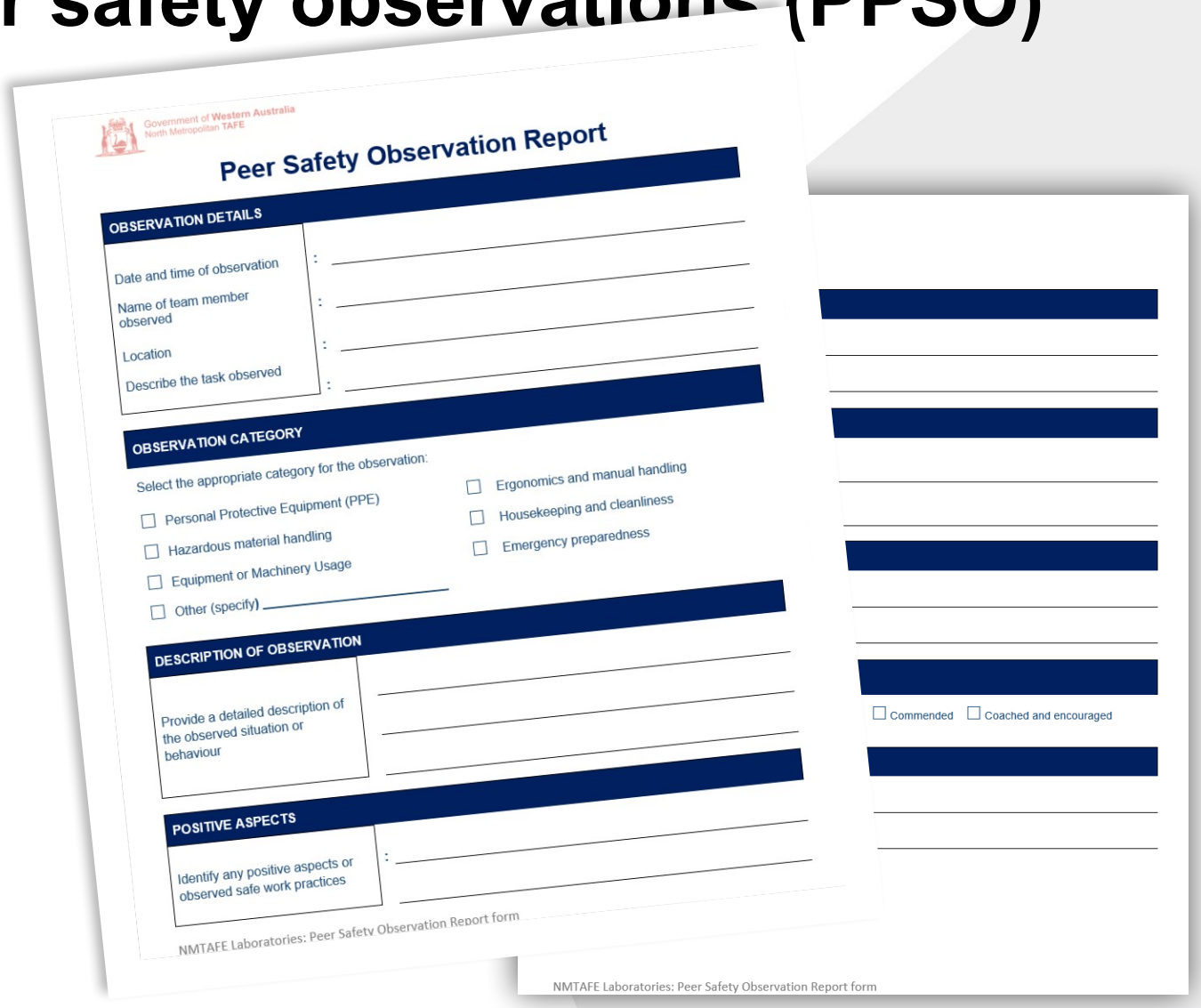
- Self-interests
- Dishonesty
- Distrust, suspicion
- Loss of the “tribe” mentality
- Tick and flick to meet compliance key performance indicators (KPIs).

Peer to peer safety observations (PPSO)

- Consists of person(s) completing a task, while a team member is observing that task with the explicit goal of identifying safe and at-risk practices.
- The observers then share those observations and offer suggestions on how to improve the at-risk work habits.
- Observations are focussed on looking at:
  - body position,
  - PPE,
  - tools & equipment,
  - the general work environment, and
  - procedures.

Peer to peer safety observations (PPSO)

- Complete 2 peer observations on 2 different team members


Government of Western Australia
North Metropolitan TAFE
Peer Safety Observation Report
OBSERVATION DETAILS
Date and time of observation
Name of team member observed
Location
Describe the task observed
OBSERVATION CATEGORY
Select the appropriate category for the observation:
Personal Protective Equipment (PPE)
Hazardous material handling
Equipment or Machinery Usage
Other (specify)
Ergonomics and manual handling
Housekeeping and cleanliness
Emergency preparedness
DESCRIPTION OF OBSERVATION
Provide a detailed description of the observed situation or behaviour
POSITIVE ASPECTS
Identify any positive aspects or observed safe work practices
NMTAFE Laboratories: Peer Safety Observation Report form
Commended
Coached and encouraged
NMTAFE Laboratories: Peer Safety Observation Report form

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Peer to peer safety observations (PPSO)

- When you're ready to begin the observation:
  - **Ask first**: Remember to ask if it's okay to observe before beginning. It's all about growth, not getting people in trouble.
  - **Record data**: use your observation form to document what you see. Be objective and specific in your notes. Include details about what led to the behaviour, the behaviour itself, and any consequences of the behaviour.
  - **Do not judge**! Avoid interfering with the observed team member's actions. Do not provide feedback or correction during the observation itself (unless it is dangerous).
  - **Remember** - the goal is to gather data for improvement, not to criticize.

Peer to peer safety observations (PPSO)

- Feedback is to be conversational, encouraging discussion
  - Start with positive feedback by acknowledging safe behaviours. This reinforces the importance of safe practices.
  - Then you can address any unsafe behaviours you observed.
    - constructive language, focussing on the behaviour, not the individual
    - explain the potential consequences and emphasize the importance of safety.
- Collaborate for improvement
  - Consider the team member's perspective on the observed behaviours, ask if there are any barriers they faced in performing safely.
  - Discuss strategies to improve safety.

Conclusion – Takeaways

What did we learn?

- Roles and responsibilities under WHS legislation of employers and employees, including supervisors and contractors
- sources of advice and information on WHS issues
- Australian, national and international standards, guidelines and codes covering WHS; occupational protective equipment; labelling of workplace substances;
- Industry specific codes, regulations and guidelines.
- how the characteristics and composition of the workforce impact on WHS management
- Housekeeping inspections to identify hazards
- Peer to peer observations can assist in improving work performance and promoting a positive safety culture in the workplace.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 - Maintain Laboratory or Field Workplace Safety

Session 5

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Recall

- WHS legislation in WA (Act & Regulations)
- Who is the regulator for WHS legislation in Western Australia?
- What is a primary duty of care and who has it?
- What is a duty of care and who has it?
- Can you list some codes of practice, guidelines for lab safety?
- Identifying hazards
- Tools to help analyse and mitigate risks

Agenda

Laboratory Safety

- SDS (continued)
- Reporting hazards, incidents/ accidents and near misses
  - Reporting matrix
  - templates
- Workplace HSE management system
- Store reagents as required
- Ensure safe disposal of laboratory/hazardous wastes
- Minimise the generation of wastes and environmental impacts

Safety data sheets (SDS)

SDSs must be:

- readily available to employees who are required to use hazardous substances
- not more than 5 years old, from issue date,
- used in training; and
- used for information about the substances for risk assessments

understanding_sds_fact_sheet.pdf (safeworkaustralia.gov.au)

Safety data sheets (SDS)

- Must be available to all workers using the chemical
- A register of SDSs must be kept for all hazardous chemicals stored and handled in a workplace.
- SDSs may be located where chemicals are used and/or stored
- Where is NMTAFE Laboratory SDS located?

Safety data sheets (SDS)

- What do I do if the SDS for the hazardous chemical I have at my workplace is out of date?
  - Remove it from publication if the chemical is no longer used
  - Request an updated version form the supplier or manufacturer
- What are the steps if the manufacturer is no longer around?

Safety data sheets (SDS)

- Activity – 20 mins
- In your assigned workgroups, each of you are to research one of the following chemicals:
  - Concentrated sulfuric acid
  - Kovacs reagent
  - Silver Nitrate (solid)
  - Potassium Permanganate
  - Sodium Hydroxide (only for groups with 5 members)

WHS management system

- Workplaces use a WHS management system (WHSMS) to demonstrate their commitment to the health and safety of employees
- *ISO 45001:2018 Occupational Safety & Health Management System*
- System provides a framework for managing
  - Policies, plans, procedures and templates
  - Instruction and training programs
  - Recordkeeping of risk registers, incidents, hazards, consultation meetings and training records
  - Perform effectiveness monitoring
  - Promote continuous improvement

WHS Management System

We have one available on BlackBoard > MSL944002 > Learning materials > WHSMS

Document	Explanation – how they support WHS
Laboratory manual	Describes the processes for working in a laboratory, including procedures and laboratory etiquette that must be followed. Examples are facilities, equipment, handling and safe storage of chemicals, glassware and samples. It will also contain safety precautions such as good manual handling techniques and good hygiene practices and reporting requirements.
Standard Operating Procedures (SOP)	Formal documentation of procedures addressing the quality and safety processes, i.e. the 'what, who, when and how' of the process, for routine activities in a laboratory. They provide general information about the activity, identify the people, resources and frequency required. SOPs can consist of one or more tasks.
Work Instructions	Describe specific step by step instructions required to implement a task within a process and contain more detail than related procedures.
Operator's manuals	Describes how to safely and efficiently operate laboratory equipment. They describe hazards, instructions for use, operator pre-use checks, routine maintenance and troubleshooting.
Manufacturers' operating manuals	Describes how to safely and efficiently operate laboratory equipment, usually in more detail than operator's manuals and include technical information relating to parts, servicing and repairs.

Requirements for record keeping that address WHS

Under the WHS Act 2020, employers are required to keep records of:

Record requirement	Example
1. Information about HSRs	• Who they are • Matters they have raised
2. All incidents including notifiable incidents	• the death of a person; or • a serious injury or illness of a person; or • a dangerous incident
3. Specified activities associated with specific people	• SOPs and work instructions, risk assessments, equipment maintenance records, SDS • Records of personal training, medical records, exposure to hazardous substances, e.g. lead, asbestos
4. The giving of notices or information about specified activities	• PINs issued by a trained HSR • Improvement notice, or prohibition notice issued by an inspector

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Privacy requirements

- Details about employees, contractors and clients must be kept private according to the Commonwealth's Privacy Act, 1988
- The process of handling employee data must be transparent and documented. A workplace must have policies and procedures covering requirements for:
  - How data is captured/ filed,
  - Security and access to data
  - Retention periods of records
  - Use of electronic communication and social media
  - Training on how to maintain confidentiality
  - Consequences for misuse of data

- Laboratories dealing with public health will have additional considerations regarding client results (health and disability information)

Handling, and storing hazardous samples and reagents

- All samples

  E.g. Food, Water, Soil and sludges, Air, Pathology

- All hazardous reagents

  According to the SDS & compatibility guides

Are all considered hazardous and must be treated as such: should be handled, stored and disposed in accordance with (safety data sheets) SDS, segregation/compatibility charts, manufacturer instructions, and workplace procedures/regulations.

Minimising Environmental Impact (Sustainability)

- Follow environmental management plans and policies to minimise the impact on the environment.
- Use resources efficiently and implement recycling and waste reduction programs.
- Ensure proper disposal of pollutants and hazardous materials to prevent environmental contamination.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Environmental sustainability issues

- Although laboratories play a crucial role in scientific research, analysis, and teaching their operations can have significant environmental impacts.
- Sustainability is when an organisation actively monitors its societal (relating to society or social relations) and environmental impacts. The goal is to profit and provide excellent customer service while contributing to the wellbeing of local communities and nature. These values can improve the health of employees, promote social causes and increase overall customer satisfaction.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Minimising Environmental Impact (Sustainability)

- **Waste Generation**: Labs generate both hazardous and non-hazardous waste. Proper disposal and recycling methods are essential to minimize the environmental footprint.

Examples:

- Researchers should prioritize waste reduction and consi der sustainable alternatives for consumables and instru ments

  .

- Correct usage and maintenance of appropriate PPE to reduce replacement cycle.
- Onsite waste management system e.g. water treatment plants.

Minimising Environmental Impact (Sustainability)

- **Chemical Usage, Storage, Disposal**: Chemicals used in experiments can harm the environment if not handled properly.

  Examples:

  – Researchers should follow best practices for chemical storage, disposal, and substitution with greener alternatives

  .

  – Choose which chemical to order and use, make up appropriate amounts to minimise hazardous waste (from reagents) exceeding shelf life.

Minimising Environmental Impact (Sustainability)

- **Chemical Usage, Storage, Disposal**: Chemicals used in experiments can harm the environment if not handled properly.

  Examples (continued):

  – Storage of hazardous materials should be appropriate (consider segregation of incompatible materials):

  Managing risks of storing chemicals in the workplace

  .

Source: Seton Australia

Minimising Environmental Impact (Sustainability)

- **Laboratory Design and Infrastructure**: Sustainable lab design includes energy-efficient devices (e.g. containment devices) and proper ventilation.

  Examples:

  - Infrastructure choices impact energy consumption and wast e management

    .

  - Australian standards relating to lab safety

Hazard control equipment in the work area

- **NMTAFE Laboratories** fume cabinets are fitted with a failsafe '*Johndec fume control system'.*
- Fume cabinets are classed as 'non-hazardous' – safe to work with flammable liquids or gases.
- Emergency isolation button is fitted to the front panel to isolate power and gas outlets in the cabinet
- Audible alarm if
  - mains power is cut
  - extraction fan failure or significant drop in flow rate (+ visual alarm activated)
  - over temperature (+visual alarm activated)

Hazard control equipment in the work area

Fume Cupboards

- Comply with **AS2248.8**
- Provide containment to safely use chemicals
- Aerodynamic chamber to evenly extract air and vent it to the outside of the building
- Scrubbers to washdown residue buildup
- **Not to be used for long term storage of chemicals**

Hazard control equipment in the work area

Class I

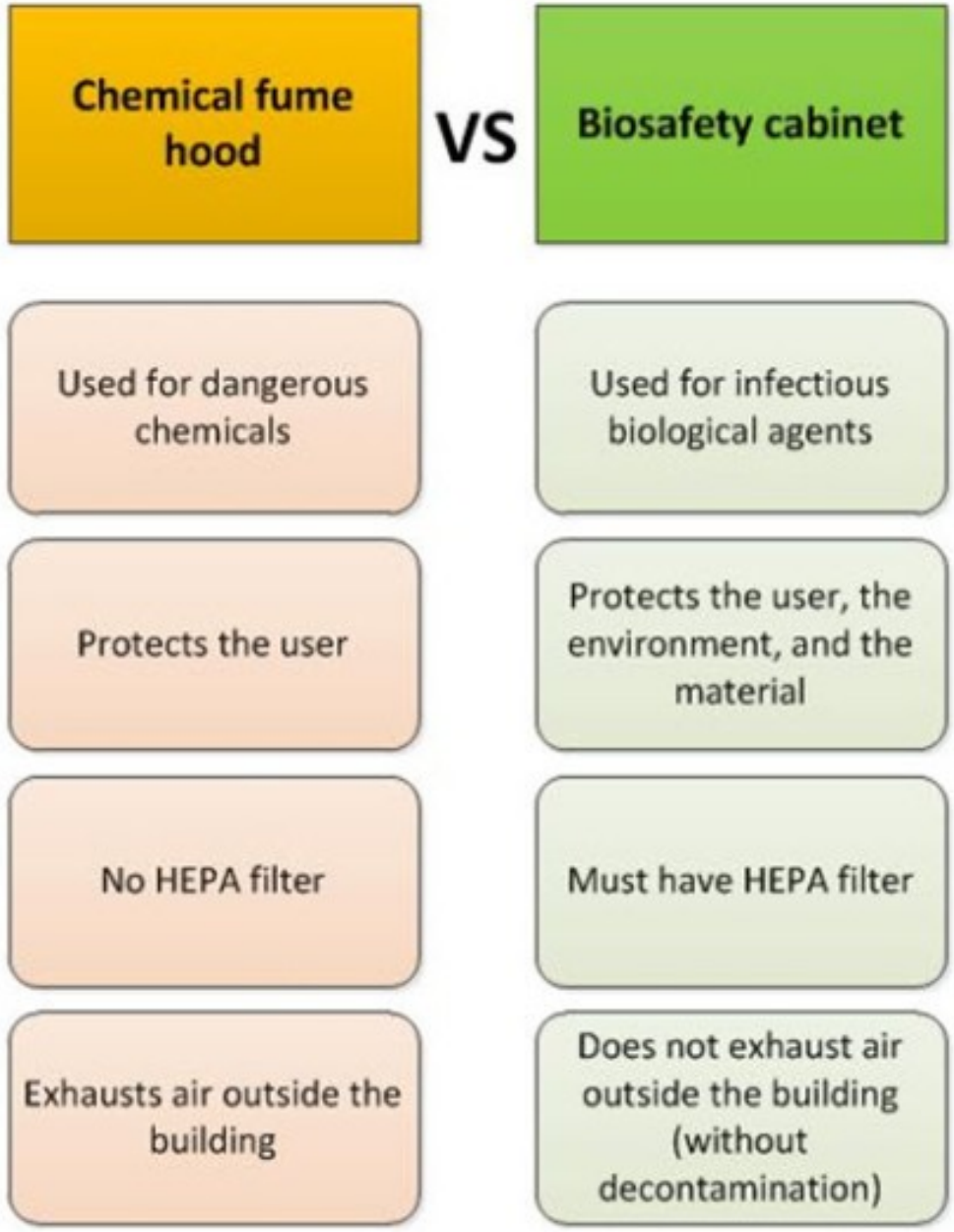
Class II

Class III

Biosafety cabinets CI/CII/CIII

- Comply with **AS2252.2-4**
- Protects the user and the environment by providing containment to safely use biohazardous or infectious substances
- Positive pressure to prevent backflow
- Filters air in and out of cabinet
- Made of stainless steel
- Optional UV light

Image sourced from Science safety security https://www.phe.gov/s3/BioriskManagement/biocontainment/Pages/BSC-vs-Fume-Hoods.aspx


Chemical fume hood
VS
Biosafety cabinet
Used for dangerous chemicals
Used for infectious biological agents
Protects the user
Protects the user, the environment, and the material
No HEPA filter
Must have HEPA filter
Exhausts air outside the building
Does not exhaust air outside the building (without decontamination)

Environmental sustainability issues as they relate to the work task

- **Collaboration and Knowledge Sharing**: Labs can collaborate to share best practices, resources, and sustainable solutions.

  Action -
  Community-wide efforts can drive positive change

Plan, be organised and trained

Re-cycle and don't waste un-necessarily

If an incident occurs

If you are involved in a workplace incident and/or sustain an injury:

- Seek first aid or medical treatment
- Verbally notify your supervisor of the incident
- Submit written notification of the incident using a workplace “event management report” within a specified time frame
- Event procedure (*exemplar on BlackBoard*)

Image sourced from:
NG IT Incident Response – NG IT Cybersecurity Hub (ng-it.co.uk)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Requirements for reporting

Exemplar reporting matrix

NMT WORKFORCE HIERARCHY NOTIFICATION TABLE

Event level	Responsible person	Persons to notify	Form	By when
Level 5	Site Manager	Managing Director Area Manager	Event report	Within 2 hrs.
Level 3 and 4	Site Manager Supervisor	Area Manager Site Manager	Event report	Within 2 hrs.
Level 2	Supervisor	Site Manager	Event report	Within 12-24 hrs.
Level 1	Supervisor	Site Manager	Event report	Within 12-24 hrs.
Hazard ID	Worker	Supervisor	Hazard report	Within 12-24 hrs.
WHS or environmental issue/ concern	Worker	Health and safety rep	Email or verbal	When become aware

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Reporting incidents – template

NMT Workforce
Civils, Mining & Resources

INCIDENT/ACCIDENT REPORT
OFFICIAL
FORM (Event Management)
To be completed by Supervisor or other suitably qualified person, NOT the employee or sub-contractor.

Report Number:

Name:	Select One of the following Incident/Accidents:				Classification: Ref page 2 bottom right for details	Actual	Potential
	☐ Lost Time injury	☐ Damage					
Occupation:	☐ Disabling Injury	☐ Security			Catastrophic	☐	☐
	☐ Medical Treated	☐ Complaint			Major	☐	☐
Project Name/No:	☐ First Aid Injury	☐ Environmental			Moderate	☐	☐
	☐ Near Miss	☐ Quality			Minor	☐	☐
Subcontractor: Y/N Company Name:	☐ Hazard Report	☐ Other			Insignificant	☐	☐
Workers Comp Claim? Please circle	Y N	Site Supervisor Notified	Y N	Area Manager Notified			Y N
Damage Cost Estimated	$	Plant No:		Registration No:			

1. Incident/Accident Details

Date of Incident/Accident: / / 20 Incident Time: _____am / pm Reported by:
Reported Date: / / 20 Reported Time: _____am / pm Reported to:
Person was: On Duty ☐ On a Work Break ☐ In a Camp ☐ Location:
Type of Plant Involved: Task Description:
Chemical/Oil Spill: 1 – 5 Litres: ☐ 6 – 10 Litres: ☐ 10 – 50 Litres: ☐ 51 – 100 Litres: ☐ Other Amount:
Chemical/Oil Recovered: 1 – 5 Litres: ☐ 6 – 10 Litres: ☐ 10 – 50 Litres: ☐ 51 – 100 Litres: ☐ Other Amount:
Receiving Medium of Spill: Soil: ☐ Stormwater Drain: ☐ Surface Water: ☐ Vegetation: ☐ Other :
Was the person working alone? Yes ☐ No ☐ If no, give names of co-workers:

2. Incident/Accident Description (What Happened)

3. Immediate Action Type (e.g. First aid, Tag Out Plant, Spill kit Used) **Chemical/Oil Spills:** Clean-up and Disposal Method

4. Details of Injury/Illness

Details of Injury:
Treatment Given: ☐ None Required: ☐ Hospital: ☐ Doctor: ☐ First Aid: ☐ Details:
Hospital Location: Medical Centre: Doctors Name:
Medical Certificate Details: Fit for Work: ☐ Alternate / Restricted Duties: ☐ Unfit for Work: ☐
Workers Compensation Pack Used: Yes ☐ No ☐ Alternate Duties Register Completed: Yes ☐ No ☐ Form 2B: Yes ☐ No ☐

Area Manager to Complete this section;

Nature of Injury Code: _____ Nature of Disease Code: _____ Details *(e.g. sprain, burn)*:
Body Location: _____ Code: _____ Breakdown Agency Code: _____
Mechanism of Injury *(e.g. fall, vehicle accident)*: _____ Code: _____

Note: for all LTI, DI, MTI and Actual level 1 and 2 incidents, the Managing Director shall be notified immediately

Site Supervisors shall within 48 hours after the occurrence submit to the Area Manager and Managing director a detailed written report of such incident and the corrective actions required.

NMT Workforce
Civils, Mining & Resources

INCIDENT/ACCIDENT REPORT
OFFICIAL
FORM (Event Management)
To be completed by Supervisor or other suitably qualified person, NOT the employee or sub-contractor.

Report Number:

5. Contributing Factors

☐ Faulty Equipment ☐ Training ☐ Inclement Weather ☐ Insufficient PPE ☐ Fire ☐ Dust ☐ Noise ☐ Vibration ☐ Test Failure ☐ Incoming Material ☐ Condition Not Met ☐ Breach Hold Point ☐ Damaged Services ☐ Damaged Property ☐ Damaged Works ☐ No Isolation Tagging ☐ Failure in Procedure ☐ Other _____

6. Incident/Accident Action in Place (prior to incident)

☐ JHA Completed ☐ PPE Worn Correctly ☐ Training/Competency ☐ Procedure (SWP) ☐ Permit ☐ Risk Assessment ☐ Signage ☐ Barricading/Bunting ☐ Isolation and Tagging ☐ Inducted ☐ Take 5 or Similar ☐ HSE Observation ☐ Other _____

7. Corrective Action (To Incident/Accident a re-occurrence of the incident)

Action	By Whom	Due Date

8. Review (The preceding information is true and correct)

Persons Involved/Witness:	Name:	Signature:
	Name:	Signature:
	Name:	Signature:
	Name:	Signature:
Supervisor:	Name:	Signature:
Site Manager:	Name:	Signature:

9. Management Review (Level 1 & 2 incidents, Actual)

Site Manager	Name:	Signature:	Date:
Area Manager	Name:	Signature:	Date:
Managing Director	Name:	Signature:	Date:

10. Close Out			**11. Classifications**	
Report Closed Out	Y	N	**Catastrophic**	Level 1 / Potential 1 - Fatality / Permanent Disability / Permanent or Irreversible Environmental Impact / Loss > $1m
Name:	**Signature:**		**Major**	Level 1 / Potential 1 - Major Injury LTI or DI / Significantly above Reportable Environmental Impact / Loss $250K - $1m
Title:	**Date:**		**Moderate**	Level 2 / Potential 2 - Serious Illness or Medical Treatment Injury / Local or Reportable Environmental Impact / Regional Media Coverage / Loss $50K - $250K
Comments:			**Minor**	Level 3 / Potential 3 - First Aid / Minor Environmental Impact / No Media Coverage / Loss $10K - $50K
			Insignificant	Level 4 / Potential 4 - No Injury / No Environmental Impact / No Media Coverage / Loss < $10K

Site Supervisors shall within 48 hours after the occurrence submit to the Area Manager and Managing director a detailed written report of such incident and the corrective actions required.

Conclusion – Takeaways

What did we learn?

- What is a WHSMS?
- Lab safety vs minimising environment impacts (sustainability)
- Identify examples of records that must be kept
- What are some requirements to maintain employee privacy?
- What is used to report hazards, incidents, accidents and near misses?
- Do you know the requirements (when/ who) for reporting?

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 – Maintain Laboratory or Field Workplace Safety

Session: JHAs

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Case study

Chemical reaction exposes worker to toxic gas

In March 2022, a worker was seriously injured after being exposed to a toxic gas following a chemical reaction in a pump shed. Initial enquiries indicate the man was using a drum pump to deliver sodium hypochlorite inadvertently into a tank containing sulphuric acid as part of a water treatment process. As a result of the two chemicals reacting, a toxic gas was generated. It escaped through an unsealed opening on the tank into the work area.

Agenda

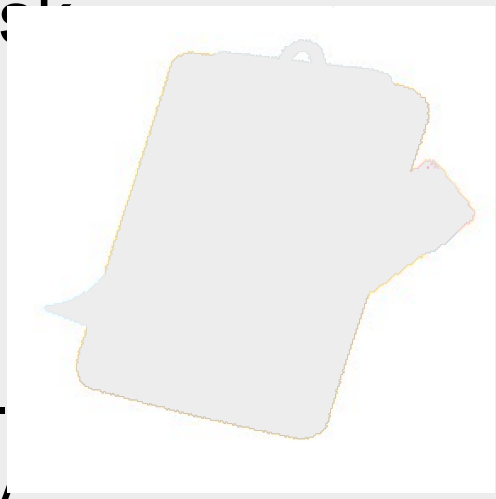
- What is a JHA?
- Preparing and planning to respond to a spill
  - Legislation, CoP, Guidance notes
  - Workplace polices, procedures
  - Safety data sheets
  - Communicate, CCCR

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

What is Job Hazard Analysis (JHA)?

- It is a method for systematically identifying and evaluating hazards associated with a particular job or task. It is also called “job safety analysis (JSA)”.



- A JHA is a tool to help prevent work-related death, injuries or illnesses by controlling identified hazards.

Why conduct a JHA?

- Risk assessments are legislated.
- Employers must provide workers with the training, equipment and supplies to do their jobs safely.

Note: The general method can be used in other loss prevention efforts such as environmental pollution prevention or fire protection.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

When should a JHA be done?

- Any job or task that meets any of the following conditions should have a JHA conducted for it:
  - Jobs or tasks with a history of injuries or near misses.
  - Jobs with catastrophic potential – fire, explosion, large chemical releases, massive equipment failure.
  - Tasks in which one simple human error could lead to serious injury.

When should a JHA be done?

- Any job or task that meets any of the following conditions should have a JHA conducted for it:
  - New people doing the task,
  - Tasks that have changed,
  - Rarely performed jobs,
  - Any job done under a “safety permit” – confined space permit, hot work permit, etc.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Break job down into key steps

1. Define the job or task to be analysed.
2. Once a job is understood, you will need to break it into **key steps** and list all the hazards associated with each step
   - Too much detail makes the JHA cumbersome, but too little detail may omit hazards.
   - Generally, limit the number of steps to **10 or less**.
   - Remember to **consult** with workers who do similar tasks other industry.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

How do I conduct a JHA?

- Identify the hazards found in each key step.
- Identify ways to control these hazards using the hierarchy of controls.
- Put the controls in place, assessing the residual risk to ensure it uses ALARP principles
- Periodically assess controls to ensure they are working correctly.
- Employers must keep a record of every JHA.

Planning and preparing for spill response

- A workplace must be compliant with legislation, codes of practice & guidance notes relating to hazardous substances.
- COP- Managing risks in the workplace
- Guidance about hazardous chemicals

Planning and preparing

- Where can we go to find information for each of the substances involved in the reaction?
- Safety Data Sheet
- Site Hazardous Substance Register
  - Lists all hazardous substances.
  - Ensures a current SDS is available.
  - May record storage location and amount stored on site in a manifest.

WORKING WITH CHEMICALS?
SDS
Safety Data Sheets give you vital information so you are aware of chemical hazards BEFORE you start using them.
POSTER FAKTORY

Image from: https://www.posterfaktory.com/shop-product/chemical-safety-posters/d105b

Workplace policies and procedures

- You must be familiar with and be able to follow the workplace policies and procedures that describe what to do in the event of a spill.
  - WHS policy, Environmental policy
  - Hazardous substance risk register
    - lists substances on site, the SDS and records known hazards & controls
  - Procedures relating to storage, handling, labelling, cleaning up spills and training.

NMTAFE Laboratories WHS Management System

- Go to Learning materials > WHS Management system
- Lists of procedures, templates and forms you can use.
- Registers to locate and store historical records of spills, incidents and other reportable information
  - https://blackboard.northmetrotafe.wa.edu.au/bbcswebdav/pid-4229210-dt-content-rid-55914709_1/xid-55914709_1

Spill management – CCCCR – part 1

- A workplace spill management process, CCCCR, provides an easy acronym for effective spill response:
- **C**ommunicate – alert fellow workers to prevent exposure and get them to evacuate buildings
  - call 000, if major,
  - call for help from colleagues if manageable, over the telephone/ using the two-way radio
  - Install a guard
  - sound an audible building alarm

Spill management – CCCCR – part 2

Effective spill response:

- **C**ontrol – ***assess the risk***, if it is safe to do so, right the container, seal a valve, close a lid, plug the leak, or hit an emergency stop, remove ignition sources, shut – off ventilation to prevent spread.

- **C**ontain – erect barriers, makeshift bunding, spill kit materials such as berms to prevent the spill from spreading further, turn off building ventilation.

Caution:
A containment system must not create new hazards by bringing non-compatible chemicals together to cause a fire, explosion, harmful reaction or evolution of flammable, toxic or corrosive vapour.

Spill management – CCCCR – part 3

- **C**lean up – use neutralising agents, flush with water, surfactants to disperse, spill kit soaker pads. All collected for disposal in the appropriate waste disposal bags.
- **R**eport - submit a workplace report, e.g. hazard report to re-fill the spill kit and notify your supervisor. Workplaces may also require incident/ event management reports particularly if medium or major spills as the workplace will have to report to the regulating authority.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Spill kits

- Bins filled with spill response items
- Items to contain and clean up a spill:
  - Absorbents, e.g. booms, socks, pillows, pads and paper rolls
  - Plastic waste disposal bags to collect the spill and clean up items
  - Chemical proof PPE, e.g. nitrile gloves, goggles, face shield, masks, shoe covers
  - Neutralisation powders and liquids, e.g. weak acids/ bases or reducing agents
  - Inert substances, vermiculite (kitty litter) or sand.
  - Compliant spill signage
  - Tools for picking up, e.g., shovel, pan, broom, extended tongs

https://shop.storemasta.com.au/collections/spill-kits

Spill kits

Image from https://www.mysafetysign.com/spill-clean-up-signs

- Located where substances are used/ stored
- Contents are dependent on the type of hazardous substances in the workplace
  - **Universal kits** – general purpose, good for absorbing common workshop liquids
  - **Hydrocarbon kits** – Oils, fuel, grease, solvents
  - **Chemical kits** – range of hazardous chemicals, e.g., corrosive, flammable acids, bases, solvents, fuels, paints, pesticides

Assessment 2 Task 3 – JHA & Safety Bulletin

- You can choose to use the prep work you have done using any legitimate external source of information regarding WHS, the Week 5 SDS activity and/or the content in Learning Materials:
  - work instructions in the NMTAFE WHS MS
  - SDSs provided
  - JHA checklist (in Week 6 folder)
- In your assigned workgroups, you are to create a JHA together, based on the chemical assigned (on the course Welcome page).
  - Individually, you will need to create a Safety Bulletin to communicate the presence of a new JHA and its key purpose/information to your colleagues.
- See AT2 Project Info document on Blackboard for more info.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 – Maintain Laboratory or Field Workplace Safety

Session 9

Agenda

Session

Recap Workforce composition and characteristics

- Consultation and cooperation requirements
- Issue resolution requirements

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Recall composition of the workforce

- Key personnel in the workplace
  - WHS Advisor, Safety Officer
  - Senior management positions and supervisors
  - Health and Safety Representative (HSR)
  - Workers

Consulting and cooperating to manage risks to health and safety

PCBUs (employers) must consult with:

- Workers, and any health and safety representatives (HSRs)
- To better understand health and safety risks
- Make better decisions about how each risk will be managed, and meet their legal obligations.

PCBUs must consult when:

- Identifying WHS hazards, assessing risks, and deciding how to manage them
- proposing changes that might affect workers' health and safety
- developing certain work procedures
- deciding what facilities workers need (e.g. toilets, eating facilities, first aid etc).

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Consulting and cooperating to manage risks to health and safety

PCBUs (employers) must also consult on any WHS matters with:

- Other PCBUs they share duties with, e.g., businesses you work with (contractors) or share premises with to make sure everyone understands:
  - what the health and safety risks are, and
  - who will be taking the necessary actions to manage the risks.

Code of practice - Work health and safety consultation, cooperation and coordination

Consulting and cooperating to manage risks to health and safety

How?

- Consultation should be done in a way that is accessible and can be understood by everyone, for example people who are culturally or linguistically diverse.
- Consultation typically occurs through team meetings and toolbox talks.
  - Smaller workplaces with few workers may elect to conduct informal talking to workers about WHS matters.
  - Larger or more complex workplaces may need more formal ways of consulting, such as by electing Health and Safety Representatives (HSRs) and formal Health and Safety Committees.
- All work groups must be notified of any outcomes as soon as practicable.

Resolving issues

- An ‘issue’ is any concern about health and safety at the workplace that remains unresolved after consultation with the affected workers and the relevant PCBU has occurred.
- PCBU should have issue resolution procedures in place
  - Process must align with the WHS Act
  - Process for representatives
  - Process to obtain agreeance

This Photo by Unknown Author is licensed under CC BY-NC

worker-representation-participation-guide_june2024.pdf (safeworkaustralia.gov.au)

Resolving issues

What if negotiations fail during consultation?

- A failed negotiation is when
  - the PCBU has not taken reasonable steps to commence negotiations with workers within 14 days after a request is made
  - an agreement cannot be reached on a matter within a reasonable time after negotiations have started.
- **Any party, i.e. worker, HSR, or PCBU can request an inspector be appointed by the Regulator, who will either make a judgement or assist in the negotiation process.**

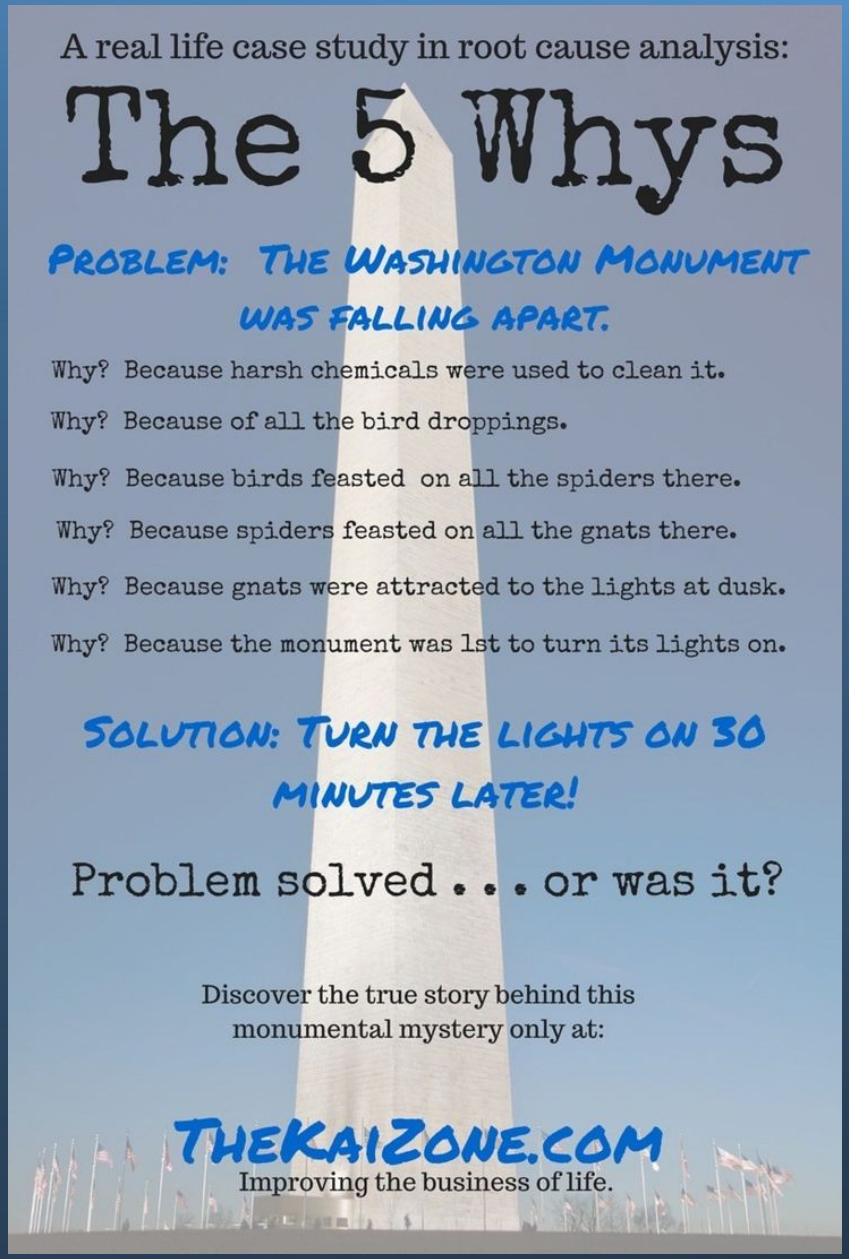
GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

MSL944002 Maintain laboratory/ field safety

Participate in health and safety investigations

09/16/2024


A real life case study in root cause analysis:
The 5 Whys
Problem: The Washington Monument was falling apart.
Why? Because harsh chemicals were used to clean it.
Why? Because of all the bird droppings.
Why? Because birds feasted on all the spiders there.
Why? Because spiders feasted on all the gnats there.
Why? Because gnats were attracted to the lights at dusk.
Why? Because the monument was lst to turn its lights on.
Solution: Turn the lights on 30 minutes later!
Problem solved . . . or was it?
Discover the true story behind this monumental mystery only at:
TheKaiZone.com
Improving the business of life.

Types of WHS incidents and accidents

In most workplaces, there is a wide range in the potential nature and severity of the incidents that may occur:

- Fire or explosions
- Structural failures or implosions
- Chemical leaks or explosions
- Vehicle collisions and electric shock
- Machinery and equipment failure, falls of objects
- Incidents involving animals such as snake bites, spider bites dogs etc.
- Incidents involving radiation, lasers, electromagnetic radiation
- Natural events such as lighting , bushfires , floods, severe storms

Credit: Columbia fire department

Incident response policies and procedures

- Workplaces are required to have policies and procedures describing who, when and how to respond to incidents. They are part of the WHSMS.
  - Identifying those people with responsibility to respond to incidents
  - Emergency response training
  - Assessing the incident scene
  - First aid for those injured
  - Initiating the response by the emergency service when appropriate
  - Evacuation
  - Securing the scene
  - Notifying the necessary internal people
  - Notifying the relevant regulatory authority
  - Conducting an investigation to determine the root causes
  - Taking effective corrective action
  - Rehabilitating the incident scene environment
  - Returning to normal operations

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident Investigation

Who should be investigating?

- Ideally, an investigation would be conducted by people experienced in investigative techniques and accident causation; knowledgeable of the work processes, and procedures
- In most cases, that responsibility falls to the supervisor of the area where the incident occurred. Other members of the team can include:
  - Employees with knowledge of the work
  - Health and safety advisor
  - Health and safety representative
  - Union representative, if applicable
  - Employees with experience in investigations
  - “Outside" experts
- The task for the Incident Investigator is to collect all the facts relating to an incident and analyse those facts to gain an understanding of how the incident occurred.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Accident Causation Theory – Swiss cheese model

- A popular system theory on accident causation is James Reason's Swiss Cheese Model (1990).
- According to this theory, each step in a process has the potential to fail.
- An organisation will build layers of defence to prevent failure.
- Each layer of defence is represented by a slice of Swiss cheese, and the possible problems or failures in that defence are represented by the holes in the cheese.
- Only when there is a breach, is there a hole and then only when those holes line up, does an incident occur.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Accident Causation Theory: Active and Latent Failures

There are two types of failures:

Active failures	Latent failures
• Are unsafe acts that can be directly linked to an accident. • An example of an active failure is a worker handling a significant explosive compound with a mortar and pestle	• contributory factors that may lie dormant for days, weeks, or months until they lead to the accident. • An example of a latent failure could be the lack of a policy describing how a given work task should be completed safely.

- The Swiss cheese model is useful in a systems approach to understand the causes of incidents.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Participating in case study

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 1 Organise information

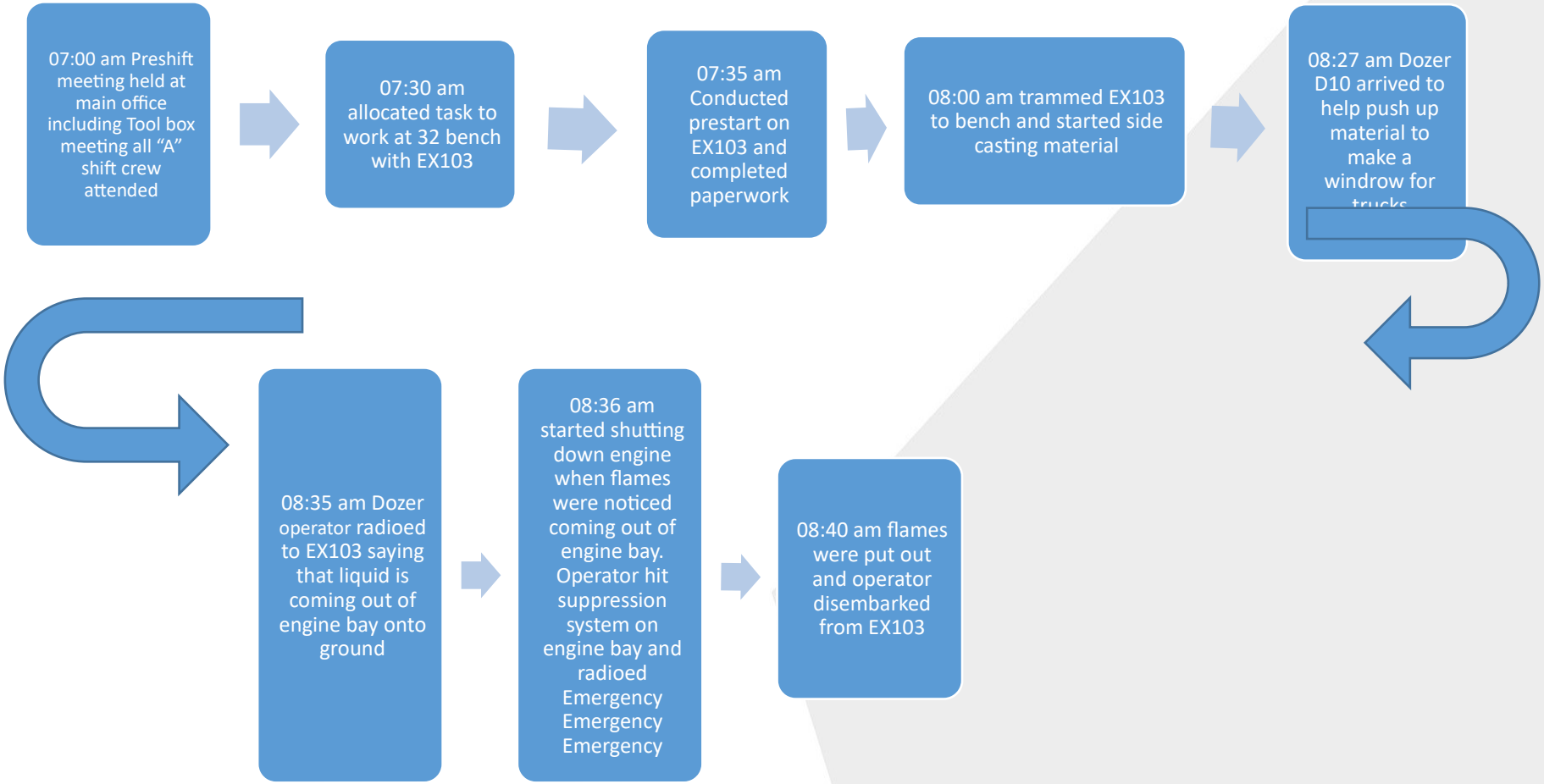
- Construct a timeline of events leading up to the incident
- A timeline chart is easy to construct and shows the events arranged progressing from left to right.
  - Identify key events relating to the incident
  - Show complex events in a logical manner.

Incident Investigation Training Video: The Incident Timeline
https://www.youtube.com/watch?v=Sup6gASsWHg

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Time line example


07:00 am Preshift meeting held at main office including Tool box meeting all "A" shift crew attended
07:30 am allocated task to work at 32 bench with EX103
07:35 am Conducted prestart on EX103 and completed paperwork
08:00 am trammed EX103 to bench and started side casting material
08:27 am Dozer D10 arrived to help push up material to make a windrow for
08:35 am Dozer operator radioed to EX103 saying that liquid is coming out of engine bay onto ground
08:36 am started shutting down engine when flames were noticed coming out of engine bay. Operator hit suppression system on engine bay and radioed Emergency Emergency Emergency
08:40 am flames were put out and operator disembarked from EX103

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 2 Analyse information

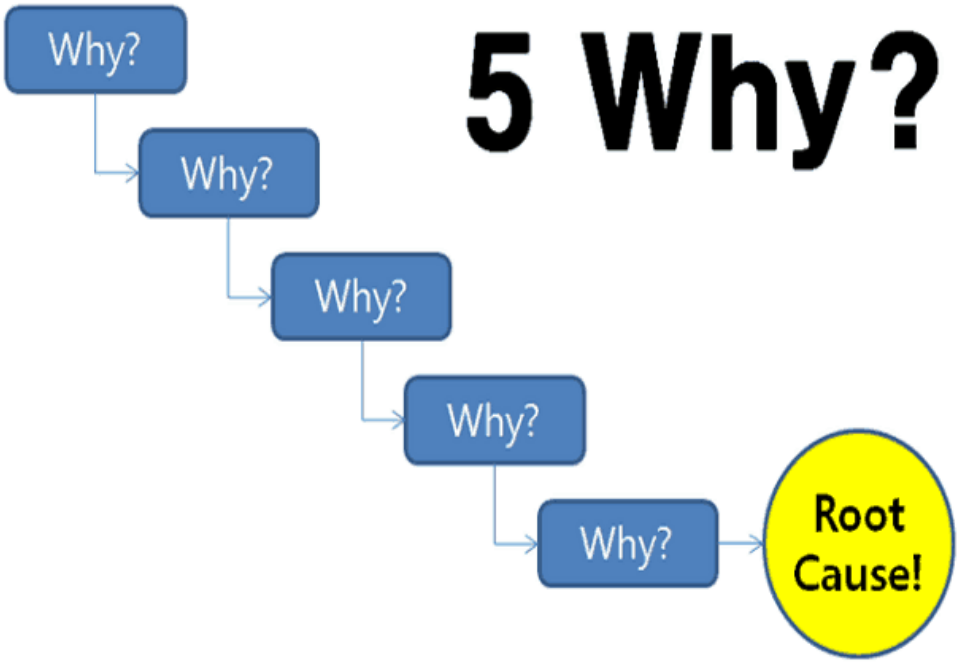
- **Analyse the events on the timeline** to determine the cause of the incident.
- To do this, you need to ask ‘why’ an event occurred and keep asking ‘why’ until you know why the event occurred.
- A techniques known as the ***5 Whys*** was developed and used by Toyota in the 1930’s.
  - When a problem occurs, you drill down to its root cause by asking "Why?" five times. Then, when a counter-measure becomes apparent, you follow it through to prevent the issue from recurring.

https://youtu.be/IRT42cT01LI?list=PLyXlJcXdGvIdP75lpgnKcILrVWs1r04CI

GOVERNMENT OF WESTERN AUSTRALIA

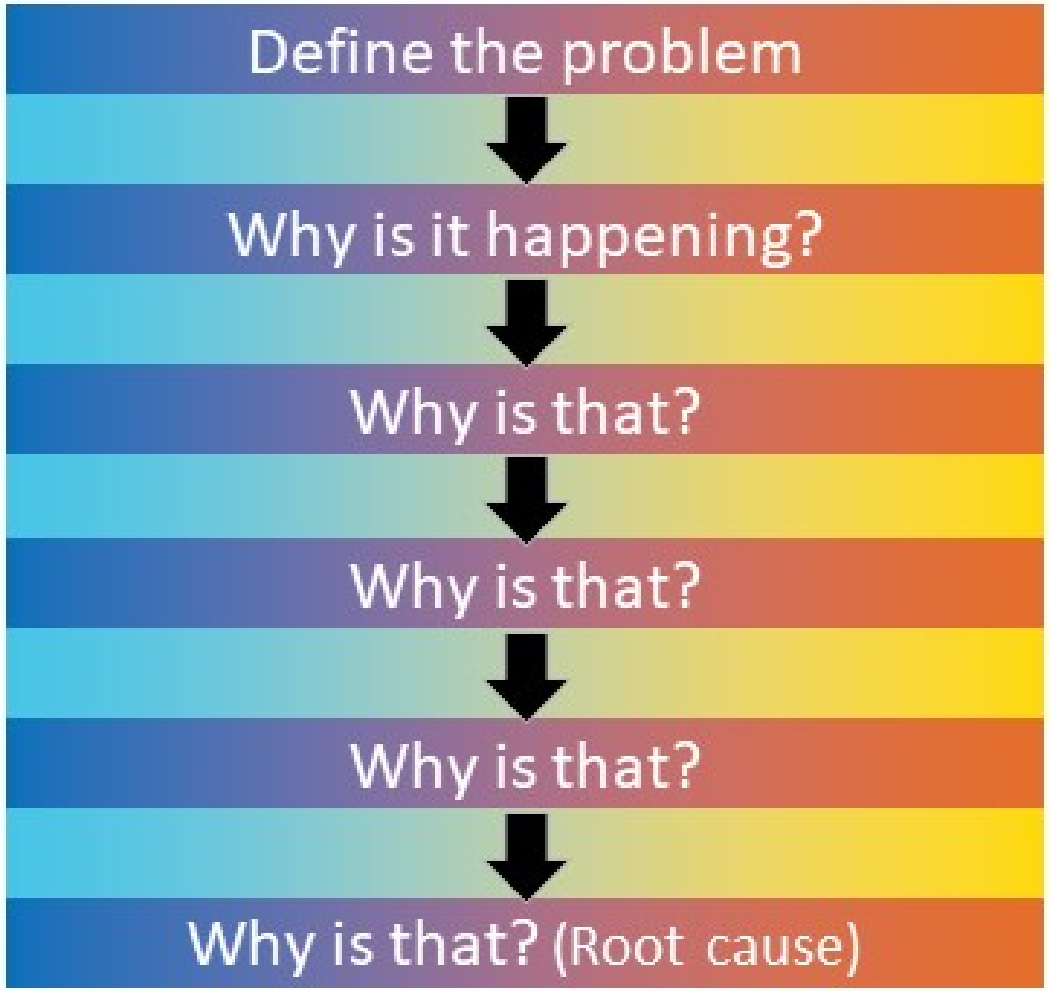
TAFE WA North Metropolitan

The 5 Whys – problem solving model



The "5" in 5 Whys is really just a "rule of thumb." In some cases, you may need to ask "Why?" a few more times before you get to the root of the problem. In other cases, you may reach this point before you ask your fifth "Why?"

THE 5 WHYS


Define the problem
Why is it happening?
Why is that?
Why is that?
Why is that?
Why is that? (Root cause)

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

5 Why Example for Explanation

- "**Why** did the robot stop?" - The circuit has overloaded, causing a fuse to blow.
- "**Why** is the circuit overloaded? - There was insufficient lubrication on the bearings, so they locked up.
- "**Why** was there insufficient lubrication on the bearings?" - The oil pump on the robot is not circulating sufficient oil.
- "**Why** is the pump not circulating sufficient oil?" - The pump intake is clogged with metal shavings.
- "**Why** is the intake clogged with metal shavings?" - Because there is no filter on the pump.

What do you think?

Is "NO FILTER ON THE PUMP" a root cause?

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 2 Analyse information

- Once you have identified causes, sort them according to the table:

Cause	Description
Failed or Absent Defences	Failures that result from inadequate or absent defences that failed to detect and/or protect against technical and/or human errors. These are often the last minute measures that failed or were missing.
Person or Team Factors	Person or team factors are errors or violations made by a person or work team and had an immediate adverse effect or were associated with personnel having direct contact with equipment.
Workplace Factors	Workplace factor are conditions in existence immediately prior to, or at the time of the Event. These might be task, situational or environmental conditions that have impacted on human and/or equipment performance.
Organisational Factors	These factors may include management decisions; poorly designed equipment; inadequate procedures; people's ignorance or poor maintenance of equipment.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 2 Analyse information

Identify the essential factor and contributing factors

- An Essential Factor must be present (or absent) to enable a sequence of events to continue, leading to damage.
- A Contributing Factor is one that increases the likelihood that the sequence of factors will alter the level of damage (better or worse) but not prevent the sequence continuing.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 2 Analyse information

Identified Human Error

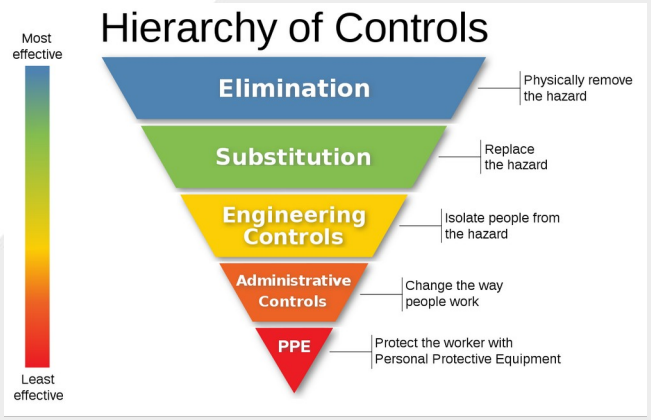
- A difficulty that has bothered many investigators is the idea that one does not want to lay blame. However, when a thorough worksite accident investigation reveals that some person or persons among management, supervisor, and the workers were apparently at fault, then this fact should be pointed out. The intention here is to remedy the situation, not to discipline an individual.
- Failing to point out human failings that contributed to an accident will not only downgrade the quality of the investigation. Furthermore, it will also allow future accidents to happen from similar causes because they have not been addressed.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 3 Recommend solutions

- Once you have identified the possible causes, you need to identify which are within the control of the workplace as they are the only causes that can have solutions.
- This may be conducted as a ***brainstorming*** activity.
- Use the hierarchy of controls to rank your possible solutions to select the best ones.



GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Incident investigation: Step 4 Report outcomes

- You will need to use a 'Incident Investigation Report template' to report investigation findings.
- Inclusion of the information you collected and your analysis charts and tables will help your manager to understand the causes of the incident and key learnings can be passed on to the appropriate persons and committees.
- The objective of an incident investigation report is to
  - Report accurately on the incident facts
  - Identify the incident mechanism and contributing factors.

GOVERNMENT OF WESTERN AUSTRALIA

TAFE WA North Metropolitan

Writing the report

- Remember the report is for managers who may be required to make decisions on the recommendations and may not have relevant operational experience or a technical background
  - Should be written in a clear, concise, logical, readable format
  - Keep the language simple and straightforward (remember - no acronyms or technical jargon) so that a layperson could read the report and basically understand it
  - Organised sequentially, chronologically or in in logical sets
  - Highlight one finding per conclusion
  - Covers issues that if corrected should prevent similar incidents elsewhere within the organisation or within the industry
  - May address positive findings such as risk controls that were effective during the incident sequence.